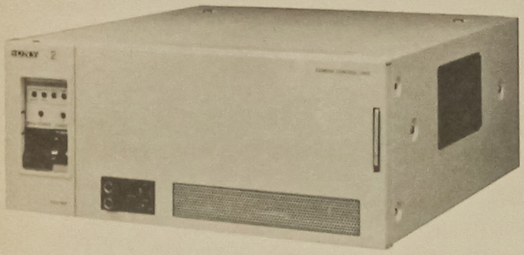
SONY®

CAMERA CONTROL UNIT

CCU-360P



OPERATION AND MAINTENANCE MANUAL
1st Edition
Serial No. 30001 to 30010

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SECTION 1
OPERATION

The CCU-360P camera control unit processes the signal picked up by the BVP-360P color video camera. The camera contol unit of this camera system is designed to be separated into two units, the signal processing unit and the control unit. The BKP-3601 camera control panel is used as the control unit. The camera control panel can be attached to the CCU-360P to use the units as one. The units can also be installed in separate places for remote control of the signal. The system can therefore be used in a wide variety of situations.

1-1. FEATURES

Variety of video inputs and outputs
Four VBS outputs are available, and the signal from one of them can be changed to a VB signal. R, G, and B signals for chroma keyer, Y, R-Y and B-Y signals for the Betacam system, and the output signals for a waveform monitor and a picture monitor are also available.
With respect to input signals, two return video signals and a video signal for tele-prompter are acceptable. Mixing of the return video and camera signals is also possible.

External sync function
The system can be locked with an external reference signal. The VBS (or BS) signal, or SYNC/SC/PAL PULSE signal selected by the built-in switch can be used as a reference signal.

Built-in color bar generator
A built-in color bar generator generates the 75% or 95% color bar signals selected by the built-in switch.

Test mode
The test mode for the CCU is provided so that operation check and maintenance can be performed easily.

Built-in encoder
The encoder is provided to control contrast and saturation. It is controlled by the control panel.

Power supply unit designed for safety in operation
When a triaxial cable is connected, low-voltage power of 30V dc is supplied to check that the camera is correctly connected, then the specified voltage of 240V ac is supplied. Alarm lamps to indicate open/short of a cable and abnormal condition of the CCU or control panel are also equipped.

Various audio connections
Two channel microphone outputs and a program audio input are equipped, and two intercom systems can be used simultaneously.
The unit can be applied to both 4W and 2W (RTS or CLEARCOM-TW12) intercom systems.

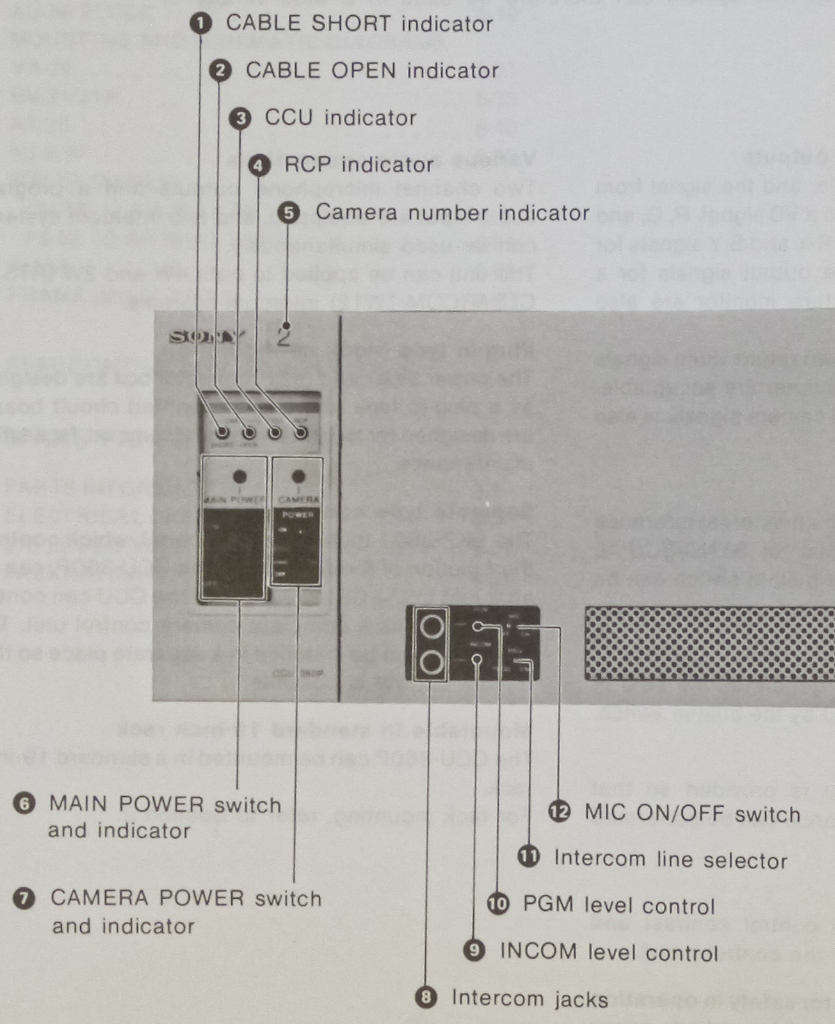
Plug-in type block configuration
The power block and triax connector box are designed as a plug-in type unit and the printed circuit boards are designed for easy insertion and removal, facilitating maintenance.

Separate type control panel
The BKP-3601 camera control panel, which controls the function of the BVP-360P and CCU-360P, can be attached to the CCU-360P, then the CCU can control the camera as a complete camera control unit. The panel can also be installed in a separate place so that remote control is possible.

Mountable in standard 19-inch rack
The CCU-360P can be mounted in a standard 19-inch rack.
For rack mounting, refer to Section 2.

1-2. LOCATION AND FUNCTION OF PARTS AND CONTROLS

1-2-1. Front Panel


❶ CABLE SHORT indicator
❷ CABLE OPEN indicator
❸ CCU indicator
❹ RCP indicator
❺ Camera number indicator
SONY
2
MAIN POWER
CAMERA POWER
❻ MAIN POWER switch and indicator
❼ CAMERA POWER switch and indicator
⓬ MIC ON/OFF switch
⓫ Intercom line selector
❿ PGM level control
❾ INCOM level control
❽ Intercom jacks

❶ **CABLE SHORT indicator***
Lights to indicate that over current is flowing in the triaxial camera cable or that some part in the unit is short circuited.

❷ **CABLE OPEN indicator***
Lights to indicate that no triaxial cable is connected to the CAMERA TRIAX connector on the rear panel or that no camera is connected.

❸ **CCU indicator***
Lights to indicate that there is some fault such as a drop in voltage due to short-circuit in the power block of the CCU-360P.

❹ **RCP (remote control panel) indicator***
Lights to indicate that there is some fault in the power supply to the BKP-3601 camera control panel or a remote control panel such as the RCP-3631, 3621, 3620.

❺ **Camera number indicator**
Attach the number plate (supplied) corresponding to the number of the connected camera.

❻ **MAIN POWER switch and indicator**
The power supply to all units of the camera system of the BVP-360P such as the BVP-360P color video camera, CCU-360P camera control unit, BKP-3601 camera control panel and remote control panel, is turned on and off by this switch. When the power is turned on, the associated indicator lights.

❼ **CAMERA POWER switch and indicator**
When the MAIN POWER switch is set to ON and the camera power button on the camera control panel or the remote control panel is lit, the power supply to the camera head can be turned on and off.

❽ **Intercom jacks** (double jacks)
Connect a headset with the double plugs. The upper jack is for program audio and the lower jack is for intercom.

❾ **INCOM (intercom) level control**
Adjusts the intercom level.

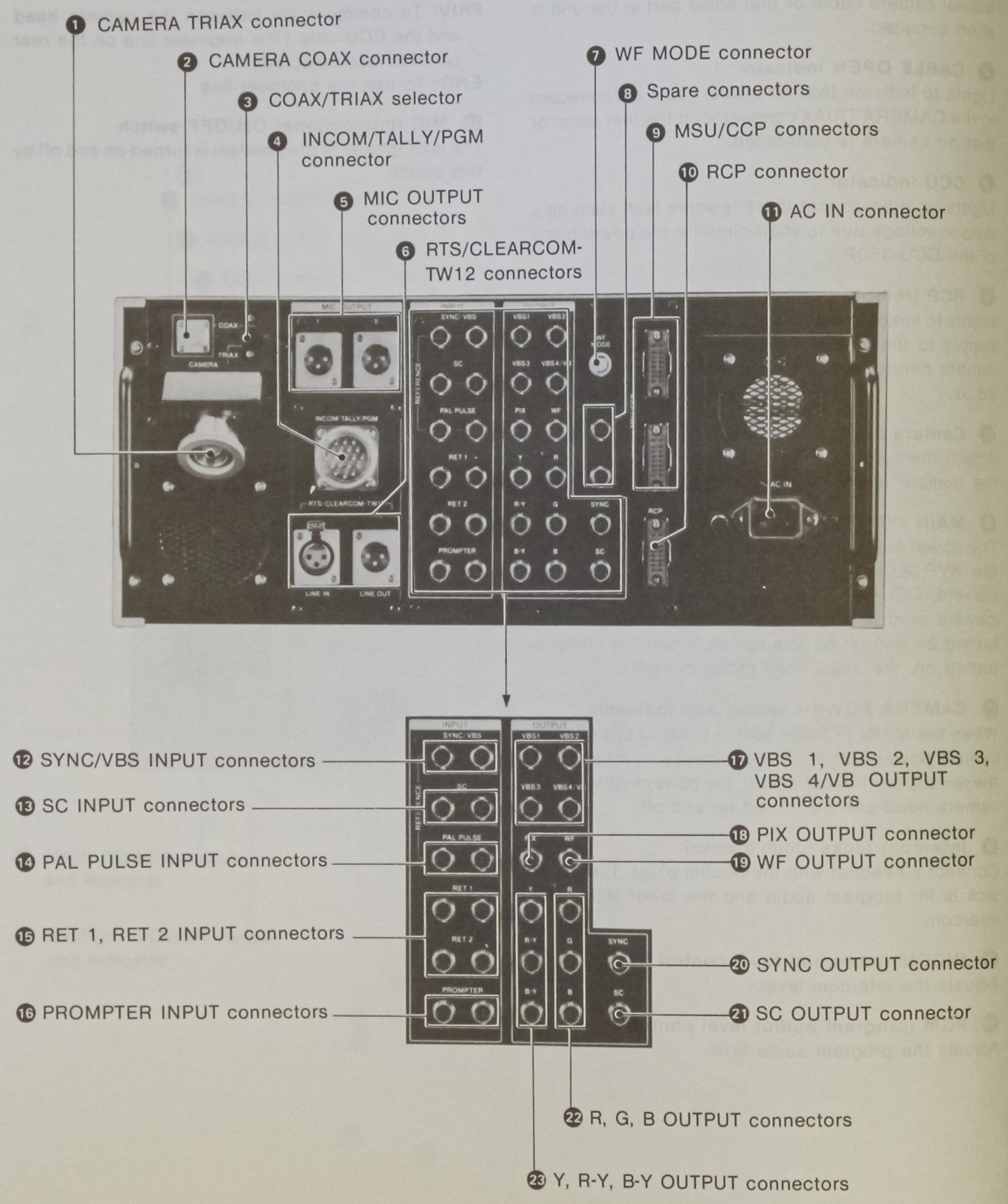
❿ **PGM (program audio) level control**
Adjusts the program audio level.

⓫ **Intercom line selector**
PROD: To use the producer line
PRIV: To communicate between the camera head and the CCU only. (The engineer line on the rear panel is disconnected.)
ENG: To use the engineer line

⓬ **MIC (microphone) ON/OFF switch**
The microphone of the headset is turned on and off by this switch.

* If one of these indicators is lit, the CCU-360P or control panel does not operate.

1-2-2. Rear Panel



① CAMERA TRIAX connector
② CAMERA COAX connector
③ COAX/TRIAX selector
④ INCOM/TALLY/PGM connector
⑤ MIC OUTPUT connectors
⑥ RTS/CLEARCOM-TW12 connectors
⑦ WF MODE connector
⑧ Spare connectors
⑨ MSU/CCP connectors
⑩ RCP connector
⑪ AC IN connector
⑫ SYNC/VBS INPUT connectors
⑬ SC INPUT connectors
⑭ PAL PULSE INPUT connectors
⑮ RET 1, RET 2 INPUT connectors
⑯ PROMPTER INPUT connectors
⑰ VBS 1, VBS 2, VBS 3, VBS 4/VB OUTPUT connectors
⑱ PIX OUTPUT connector
⑲ WF OUTPUT connector
⑳ SYNC OUTPUT connector
㉑ SC OUTPUT connector
㉒ R, G, B OUTPUT connectors
㉓ Y, R-Y, B-Y OUTPUT connectors

① CAMERA TRIAX connector
Connect a BVP-360P using a triaxial cable. The power, control signal, video signal, audio signal, etc. are connected by a triaxial cable.
There are several types of triaxial connectors. The unit can be used with any type of connector simply by changing the connector block.

② CAMERA COAX connector
Connect to the coaxial connector on the BVP-360P camera head by using a coaxial cable. All signals except for the power can be connected by a coaxial cable.
When the camera head is connected using this connector, the power should be supplied to the camera head from a power supply unit.

③ COAX/TRIAX selector
Set to the appropriate position according to the connector used for connecting the camera head.
COAX: when a CAMERA COAX connector is used
TRIAX: when a CAMERA TRIAX connector is used

④ INCOM/TALLY/PGM (intercom/tally/program audio) connector (19-pin)
The intercom, tally and program audio signals are connected by this connector. Connect to the intercom/tally/program audio connector on the control console or intercom system.

⑤ MIC OUTPUT connectors (XLR 3-pin)
The signals picked up by the microphones of the camera head are output.

⑥ RTS/CLEARCOM-TW12 connectors (XLR 3-pin)
These are the connectors for the RTS or CLEARCOM-TW12 intercom system.

⑦ WF MODE (waveform monitor mode) connector (4-pin)
Connect to a Tektronix waveform monitor to monitor the signals in sequential mode. When the SEQ button on the BKP-3601 camera control panel is pressed, the staircase signal is output here, and the R, G and B signals can be monitored simultaneously in sequential mode.

⑧ Spare connectors (BNC type)
These are spare connectors and nothing is connected.

⑨ MSU/CCP (master setup unit/camera control panel) connectors (16-pin)
Connect the MSU-360 master setup unit (optional) using a CCA-2 connecting cable or the BKP-3601 camera control panel (optional) using a CCA-1 connecting cable. The control signals are connected through this connector. When the BKP-3601 is connected, the power is also supplied to the BKP-3601.
Both connectors have a loop-through configuration. When the MSU-360 is connected to either of these connectors, two or more CCU connected by bridge connection can be controlled by the MSU-360 simultaneously.

⑩ RCP (remote control panel) connector (16-pin)
Connect the RCP-3600 series remote control panel such as the RCP-3631, 3621, 3620, using a CCA-2 connecting cable. The power and the control signals are connected.

⑪ AC IN connector
Connect to an ac power source using the supplied power cord.

⑫ SYNC/VBS INPUT connectors (BNC type)*
Connect a reference sync signal (SYNC or VBS) for the external sync. When the SYNC signal is connected, the reference subcarrier signal should be connected to the SC INPUT and PAL PULSE INPUT connectors, but when the VBS signal is connected, the subcarrier and PAL pulse signals need not be connected.

⑬ SC (subcarrier) INPUT connectors (BNC type)*
Connect a reference subcarrier signal for the external sync.
When the SYNC signal is connected to the SYNC/VBS INPUT connector, be sure to connect a reference subcarrier signal here.

⑭ PAL PULSE INPUT connectors (BNC type)*
When the SYNC signal is connected to the SYNC/VBS INPUT connector, connect the PAL pulse signal for the external sync.

⑮ RET 1, RET 2 (return video 1, 2) INPUT connectors (BNC type)*
The return video signals from two different systems can be connected here. The RET 1 or RET 2 signal is selected by the buttons on the BVP-360P.

⑯ PROMPTER INPUT connectors (BNC type)*
Connect the signal for the teleprompter. When a prompter monitor is used, the BKP-3602 and BKP-3603 prompter board kits (optional) are required.

⑰ VBS 1, VBS 2, VBS 3, VBS 4/VB OUTPUT connectors (BNC type)
The signal picked up by the camera head is output as the composite video signal (VBS). The output signal from the VBS 4 connector can be changed to the VB signal by the switch on the built-in VA board. (For details, refer to Section 2 and following.)

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* All input connectors have a loop-through configuration so that bridge connection can be made. When these connectors are used, be sure to terminate by 75 ohms.

⑱ PIX (picture monitor) OUTPUT connector (BNC type)
The video signal for a picture monitor is output here. The signal selected by the PICTURE MONITOR SELECT buttons on the BKP-3601, etc. is supplied.

⑲ WF (waveform monitor) OUTPUT connector (BNC type)
The video signal for a waveform monitor is output here. The signal selected by the WAVEFORM MONITOR SELECT buttons on the BKP-3601, etc. is supplied.

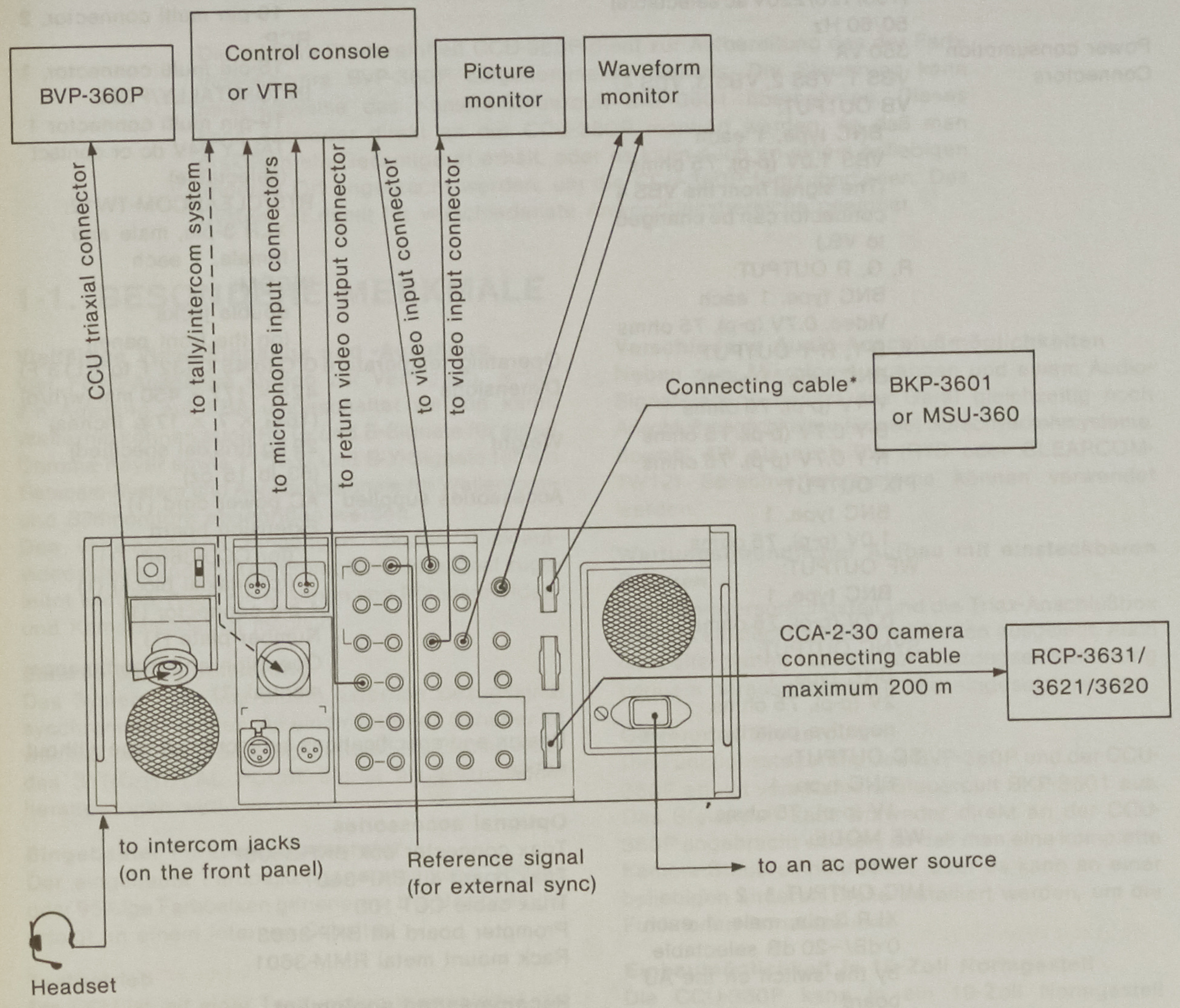
⑳ SYNC OUTPUT connector (BNC type)
The sync signal (2 Vp-p, 75 ohms) generated by the built-in sync generator is output here. Connect to the sync signal input connector on the waveform monitor, picture monitor, etc.

㉑ SC (subcarrier) OUTPUT connector (BNC type)
The subcarrier signal (1 Vp-p, 75 ohms) generated by the built-in sync generator is output here. Use this signal for locking a vectorscope, etc. to an external signal.

㉒ R, G, B OUTPUT connectors (BNC type)
The R, G and B signals for the chroma keyer are output from the corresponding connector.

㉓ Y, R-Y, B-Y OUTPUT connectors (BNC type)
The Y, R-Y, and B-Y signals are output from the corresponding connectors. Connect to a Betacam series VTR, digital VTR, etc.

1-3. CONNECTIONS


BVP-360P
Control console or VTR
Picture monitor
Waveform monitor
CCU triaxial connector
to tally/intercom system
to microphone input connectors
to return video output connector
to video input connector
to video input connector
Connecting cable*
BKP-3601 or MSU-360
CCA-2-30 camera connecting cable maximum 200 m
RCP-3631/ 3621/3620
to intercom jacks (on the front panel)
Reference signal (for external sync)
to an ac power source
Headset

* When the BKP-3601 is used, connect the unit using the CCA-1-15 camera connecting cable. The cable can be extended up to 15 meters. When the MSU-360 is used, connect the unit using the CCA-2-30 camera connecting cable. The cable can be extended up to 300 meters.

- When the unit is installed in the rack, use the RMM-3601 rack mount metal (optional). (For details, refer to Section 2 and following.)

1-4. SPECIFICATIONS

Power sources	240V ac ±10% (100/120/220V ac selectable) 50/60 Hz
Power consumption	350 VA
Connectors	VBS 1, VBS 2, VBS 3, VBS 4/ VB OUTPUT: BNC type, 1 each VBS 1.0V (p-p), 75 ohms (The signal from the VBS 4 connector can be changed to VB.) R, G, B OUTPUT: BNC type, 1 each Video, 0.7V (p-p), 75 ohms Y, B-Y, R-Y OUTPUT: BNC type, 1 each Y 1V (p-p), 75 ohms B-Y 0.7V (p-p), 75 ohms R-Y 0.7V (p-p), 75 ohms PIX OUTPUT: BNC type, 1 1.0V (p-p), 75 ohms WF OUTPUT: BNC type, 1 0.7V (p-p), 75 ohms SYNC OUTPUT: BNC type, 1 2V (p-p), 75 ohms, negative polarity SC OUTPUT: BNC type, 1 1V (p-p), 75 ohms WF MODE: 4-pin, 1 MIC OUTPUT 1, 2 XLR 3-pin, male, 1 each 0 dB/−20 dB selectable by the switch on the AU board SYNC/VBS INPUT: BNC type, 2 SYNC 2V (p-p), 75 ohms or VBS 1.0V (p-p), 75 ohms SC INPUT: BNC type, 2 1V (p-p), 75 ohms PAL PULSE: BNC type, 2 2V (p-p), 75 ohms RET 1, RET 2 INPUT: BNC type, 2 each 1V (p-p), 75 ohms PROMPTER INPUT: BNC type, 2 each 1V (p-p) 75 ohms MSU/CCP: 16-pin multi connector, 2 RCP: 16-pin multi connector, 1 INCOM/TALLY/PGM: 19-pin multi connector 1 TALLY 24V dc or contact (selectable) RTS/CLEARCOM-TW12: XLR 3-pin, male and female, 1 each INCOM: double jacks (on the front panel)
Operating temperature	0°C to 45°C (32°F to +113°F)
Dimensions	424 × 177 × 450 mm (w/h/d) (16¾ × 7 × 17¾ inches)
Weight	29 kg (triaxial specified) (63 lb 15 oz)
Accessories supplied	AC power cord (1) Extension board (for CCU-360P) (1) (for triaxial block) (1) 4-pin connector (1) Number plate (1) Operation and maintenance manual (1)

Design and specifications subject to change without notice.

Optional accessories
Triax connector box BKP-3606F
Triax board kit BKP-3607
Triax cable CCT-100
Prompter board kit BKP-3603
Rack mount metal RMM-3601

Recommended equipment
Color video camera BVP-360P
Prompter board kit BKP-3602
Camera control panel BKP-3601
Remote control panel RCP-3631, RCP-3621, RCP-3620
Master setup unit MSU-360

TEIL 1
BETRIEB

Die Kamera-Steuereinheit CCU-360P dient zur Aufbereitung des der Farb-Videokamera BVP-360P aufgenommenen Signals. Die Steuerung kann beispielsweise das Kamera-Steuerpult BKP-3601 übernehmen. Dieses kann entweder direkt an der CCU-360P montiert werden, so daß man praktisch ein Gesamtgerät erhält, oder es kann auch an einem beliebigen anderen Ort angebracht werden, um die CCU-360P fernzubedienen. Das System ist damit für verschiedenste Anwendungsbereiche geeignet.

1-1. BESONDERE MERKMALE

Vielfältige Video-Eingänge und -Ausgänge
Vier FBAS-Ausgänge stehen zur Verfügung, wobei ein Ausgang auf FBA umgeschaltet werden kann. Weiterhin können auch R-, G- und B-Signale für einen Chroma-Keyer sowie Y-, R-Y- und B-Y-Signale für ein Betacam-System und Ausgangssignale für Wellenform- und Bildmonitore abgegriffen werden.
Den verschiedenen Eingängen können Rücklaufvideosignale und ein Teleprompter-Videosignal zugeleitet werden. Auch ein Mischen von Rücklauf-Video- und Kamerasignal ist möglich.

Externe Synchronisierung
Das System kann mit einem externen Bezugsignal synchronisiert werden. An einem internen Schalter ist wählbar, ob das FBAS-Signal (bzw. BS-Signal) oder das SYNC/HT/PAL PULSE-Signal als Bezugsignal herangezogen wird.

Eingebauter Farbbalkengenerator
Der eingebaute Farbbalkengenerator kann 75%ige oder 95%ige Farbbalken generieren. Die Umschaltung erfolgt an einem internen Schalter.

Testbetrieb
Die CCU ist mit einer Testfunktion ausgestattet, die den Betrieb und die Wartung wesentlich erleichtert.

Eingebauter Codierer
Der vom Steuerpult aus eingestellte Codierer regelt Kontrast und Sättigung.

Sichere Stromversorgung
Dem Anschluß eines Triaxialkabels wird zur Überprüfung des vorschriftsmäßigen Anschlusses der Kamera zunächst eine Gleichspannung von 30V und erst dann die Betriebsspannung von 240V Wechselspannung zugeleitet. Bei einem Kurzschluß im Kabel oder bei schlechtem Kontakt sowie bei abnormalem Betrieb der CCU oder des Steuerpultes leuchten Warnindikatoren auf.

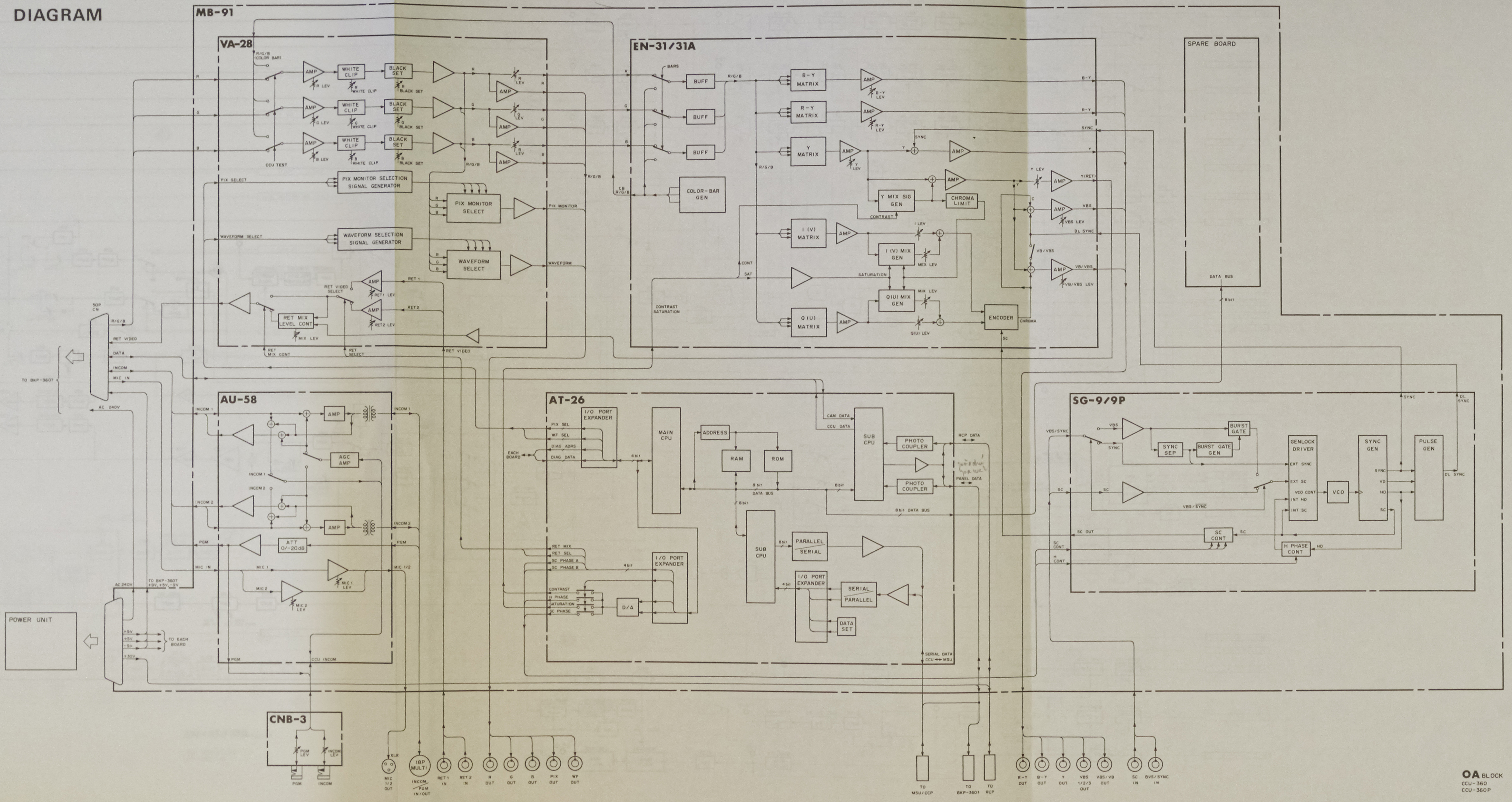
Verschiedene Audio-Anschlußmöglichkeiten
Neben zwei Mikrofon-Ausgängen und einem Audio-Signaleingang besitzt das Gerät gleichzeitig noch Anschlußmöglichkeiten für zwei Sprechverkehrsysteme. Sowohl 4W als auch 2W (RTS oder CLEARCOM-TW12) Sprechverkehrsysteme können verwendet werden.

Wartungsfreundlicher Aufbau mit einsteckbaren Blöcken
Der Stromversorgungsteil und die Triax-Anschlußbox sind als einsteckbare Blockeinheiten ausgelegt. Auch die Leiterplatten können zur Wartungserleichterung bequem herausgenommen und eingesetzt werden.

Getrenntes Steuerpult
Die Funktionssteuerung des BVP-360P und der CCU-360P erfolgt vom Kamera-Steuerpult BKP-3601 aus. Das Steuerpult kann entweder direkt an der CCU-360P angebracht werden, so daß man eine komplette Kamera-Steuereinheit erhält, oder es kann an einer beliebigen anderen Stelle installiert werden, um die Funktionen fernzusteuern.

Einbaumöglichkeit in 19-Zoll Normgestell
Die CCU-360P kann in ein 19-Zoll Normgestell eingebaut werden.
Zum Einbau siehe Teil 2.

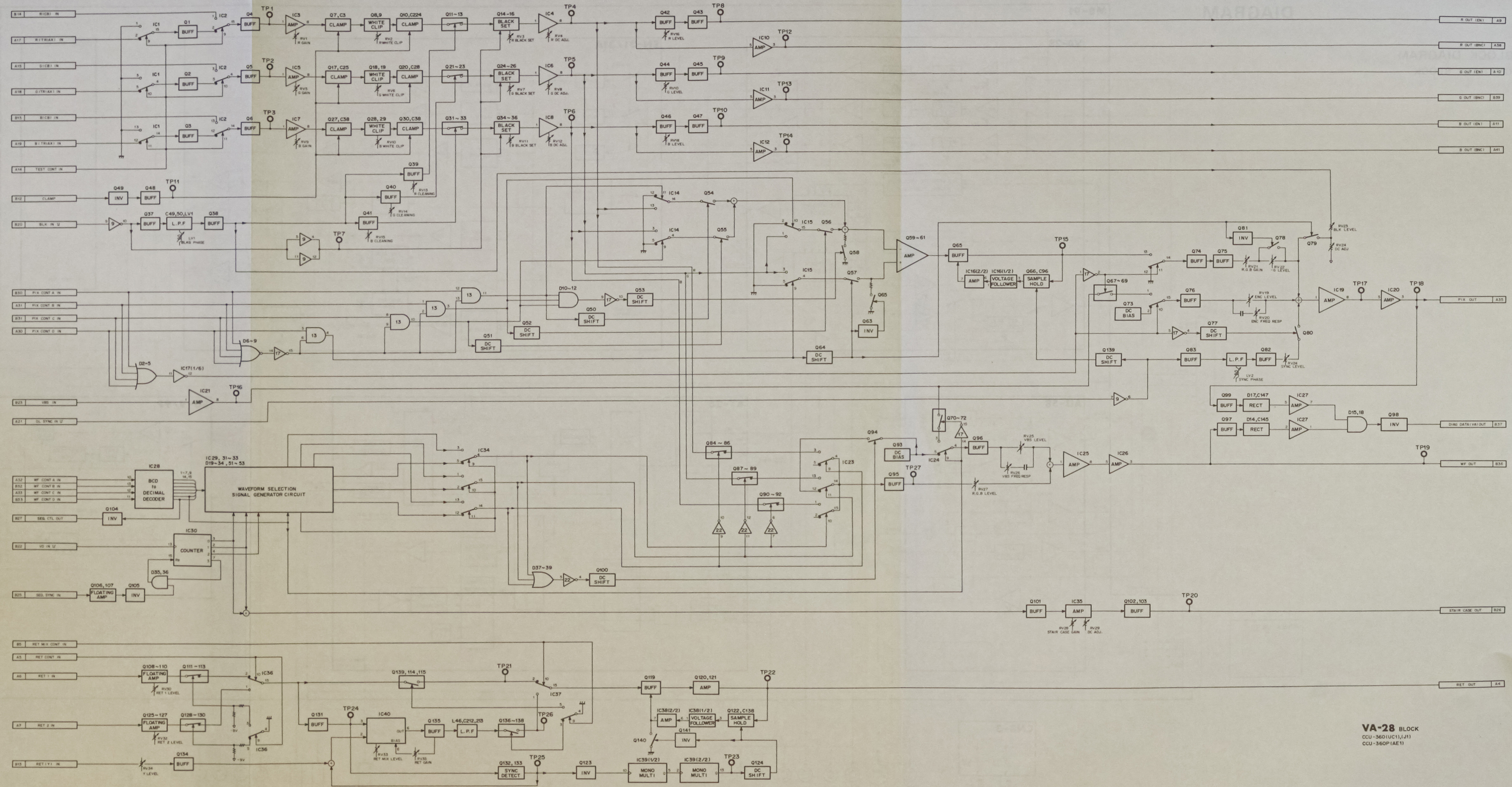
SECTION 6
DIAGRAM


MB-91
VA-28
AMP
WHITE CLIP
BLACK SET
R LEV
G LEV
B LEV
CCU TEST
R/G/B (COLOR BAR)
PIX SELECT
PIX MONITOR SELECTION SIGNAL GENERATOR
PIX MONITOR SELECT
PIX MONITOR
WAVEFORM SELECT
WAVEFORM SELECTION SIGNAL GENERATOR
WAVEFORM
RET VIDEO SELECT
RET1 LEV
RET2 LEV
RET MIX LEVEL CONT
MIX LEV
RET MIX CONT
RET SELECT
RET VIDEO
50P CN
R/G/B
DATA
INCOM
MIC IN
AC 240V
TO BKP-3607
EN-31/31A
BARS
BUFF
B-Y MATRIX
R-Y MATRIX
Y MATRIX
I (V) MATRIX
Q (U) MATRIX
COLOR-BAR GEN
Y MIX SIG GEN
I (V) MIX GEN
Q(U) MIX GEN
CHROMA LIMIT
ENCODER
CONTRAST
SATURATION
Y LEV
VBS LEV
VB/VBS
VB/VBS LEV
B-Y LEV
R-Y LEV
SYNC
DL SYNC
CHROMA
SPARE BOARD
DATA BUS
8 bit
AU-58
INCOM 1
INCOM 2
AGC AMP
ATT 0/-20dB
PGM
MIC 1
MIC 2
MIC 1 LEV
MIC 2 LEV
MIC 1/2
CCU INCOM
AT-26
I/O PORT EXPANDER
PIX SEL
WF SEL
DIAG ADRS
DIAG DATA
EACH BOARD
MAIN CPU
ADDRESS
RAM
ROM
SUB CPU
CAM DATA
CCU DATA
PHOTO COUPLER
RCP DATA
PANEL DATA
8 bit DATA BUS
PARALLEL SERIAL
SERIAL PARALLEL
DATA SET
RET MIX
RET SEL
SC PHASE A
SC PHASE B
CONTRAST
H PHASE
SATURATION
SC PHASE
D/A
4 bit
SERIAL DATA CCU ↔ MSU
SG-9/9P
VBS/SYNC
SYNC SEP
BURST GATE
BURST GATE GEN
GENLOCK DRIVER
EXT SYNC
EXT SC
VCO CONT
INT HD
INT SC
VCO
SYNC GEN
PULSE GEN
SC CONT
H PHASE CONT
SC OUT
SC CONT
H CONT
VD
HD
POWER UNIT
+9V
+5V
-5V
+30V
TO EACH BOARD
CNB-3
PGM LEV
INCOM LEV
PGM
INCOM
XLR
MIC 1/2 OUT
18P MULTI
INCOM PGM IN/OUT
RET 1 IN
RET 2 IN
R OUT
G OUT
B OUT
PIX OUT
WF OUT
TO MSU/CCP
TO BKP-3601
TO RCP
R-Y OUT
B-Y OUT
Y OUT
VBS 1/2/3 OUT
VBS/VB OUT
SC IN
BVS/SYNC IN

OA BLOCK
CCU-360
CCU-360P

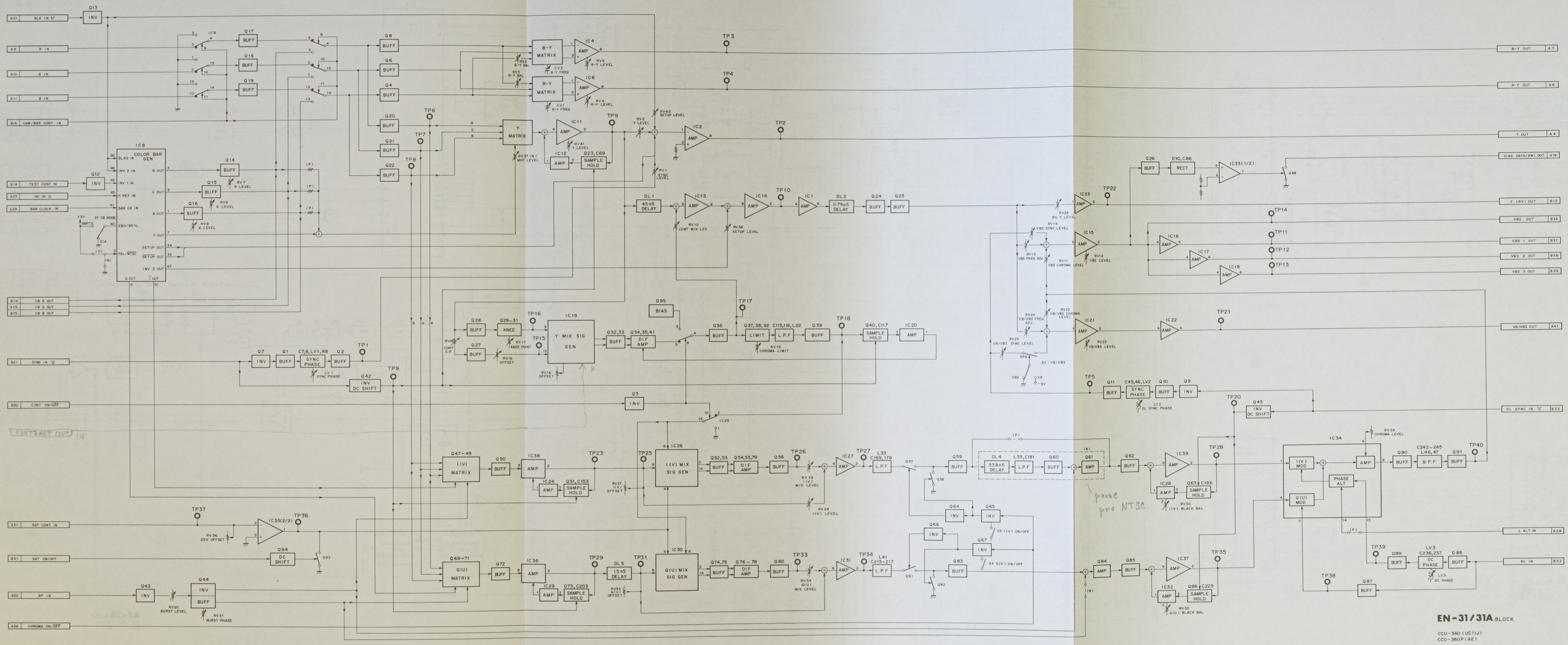
VA-28 BLOCK

VA-28 BLOCK


B14 R(CB) IN
A17 R(TRIAX) IN
A15 G(CB) IN
A18 G(TRIAX) IN
B15 B(CB) IN
A19 B(TRIAX) IN
A14 TEST CONT IN
B12 CLAMP
B20 BLK IN U
B30 PIX CONT A IN
A31 PIX CONT B IN
B31 PIX CONT C IN
A30 PIX CONT D IN
B23 VBS IN
A21 DL SYNC IN U
A32 WF CONT A IN
B32 WF CONT B IN
A33 WF CONT C IN
B33 WF CONT D IN
B27 SEQ. CTL OUT
B22 VD IN U
B25 SEQ. SYNC IN
B5 RET MIX CONT IN
A5 RET CONT IN
A6 RET 1 IN
A7 RET 2 IN
B13 RET (Y) IN
IC1
IC2
Q1 BUFF
Q2 BUFF
Q3 BUFF
Q4 BUFF
Q5 BUFF
Q6 BUFF
TP1
TP2
TP3
IC3 AMP
RV1 R GAIN
IC5 AMP
RV5 G GAIN
IC7 AMP
RV9 B GAIN
Q7, C3 CLAMP
Q8, 9 WHITE CLIP
RV2 R WHITE CLIP
Q10, C224 CLAMP
Q11~13
Q14~16 BLACK SET
RV3 R BLACK SET
IC4
RV4 R DC ADJ.
TP4
Q17, C25 CLAMP
Q18, 19 WHITE CLIP
RV6 G WHITE CLIP
Q20, C28 CLAMP
Q21~23
Q24~26 BLACK SET
RV7 G BLACK SET
IC6
RV8 G DC ADJ.
TP5
Q27, C38 CLAMP
Q28, 29 WHITE CLIP
RV10 B WHITE CLIP
Q30, C38 CLAMP
Q31~33
Q34~36 BLACK SET
RV11 B BLACK SET
IC8
RV12 B DC ADJ.
TP6
Q42 BUFF
Q43 BUFF
TP8
RV16 R LEVEL
IC10 AMP
TP12
Q44 BUFF
Q45 BUFF
TP9
RV10 G LEVEL
IC11 AMP
TP13
Q46 BUFF
Q47 BUFF
TP10
RV18 B LEVEL
IC12 AMP
TP14
R OUT (EN) A9
R OUT (BNC) A38
G OUT (EN) A10
G OUT (BNC) B39
B OUT (EN) A11
B OUT (BNC) A41
Q49 INV
Q48 BUFF
TP11
Q37 BUFF
C49, 50, LV1 L.P.F
LV1 BLKG PHASE
Q38 BUFF
Q39 BUFF
RV13 R CLEANING
Q40 BUFF
RV14 G CLEANING
Q41 BUFF
RV15 B CLEANING
TP7
IC14
Q54
Q55
IC15
Q56
Q57
Q58
Q65
Q63 INV
Q64 DC SHIFT
Q59~61 AMP
Q65 BUFF
IC16(2/2) AMP
IC16(1/2) VOLTAGE FOLLOWER
Q66, C96 SAMPLE HOLD
TP15
Q67~69
Q73 DC BIAS
Q74 BUFF
Q75 BUFF
RV21 R.G.B GAIN
RV22 G LEVEL
Q81 INV
Q78
Q79
RV23 BLK LEVEL
RV24 DC ADJ.
Q76 BUFF
RV19 ENC LEVEL
RV20 ENC FREQ RESP
Q77 DC SHIFT
Q80
IC19 AMP
TP17
IC20 AMP
TP18
PIX OUT A35
Q139 DC SHIFT
Q83 BUFF
L.P.F
LV2 SYNC PHASE
Q82 BUFF
RV24 SYNC LEVEL
D10~12
Q53 DC SHIFT
Q50 DC SHIFT
Q52 DC SHIFT
Q51 DC SHIFT
D6~9
D2~5
IC17(1/6)
IC21 AMP
TP16
Q99 BUFF
D17, C147 RECT
IC27 AMP
Q97 BUFF
D14, C145 RECT
IC27 AMP
D15, 18
Q98 INV
DIAG DATA (VA) OUT B37
IC28 BCD to DECIMAL DECODER
IC29, 31~33
D19~34, 51~53
WAVEFORM SELECTION SIGNAL GENERATOR CIRCUIT
Q104 INV
IC30 COUNTER
D35, 36
Q106, 107 FLOATING AMP
Q105 INV
IC34
Q84~86
Q87~89
Q90~92
IC23
Q94
Q93 DC BIAS
Q95 BUFF
TP27
RV27 R.G.B LEVEL
Q70~72
IC24
Q96 BUFF
RV25 VBS LEVEL
RV26 VBS FREQ RESP
IC25 AMP
IC26 AMP
TP19
WF OUT B36
D37~39
Q100 DC SHIFT
Q101 BUFF
IC35 AMP
RV28 STAIR CASE GAIN
RV29 DC ADJ.
Q102, 103 BUFF
TP20
STAIR CASE OUT B26
Q108~110 FLOATING AMP
RV30 RET 1 LEVEL
Q111~113
IC36
Q125~127 FLOATING AMP
RV32 RET 2 LEVEL
Q128~130
-9V
Q134 BUFF
RV34 Y LEVEL
Q139, 114, 115
TP21
IC37
Q131 BUFF
TP24
IC40
OUT
BIAS
RV33 RET MIX LEVEL
RV30 RET GAIN
Q135 BUFF
L46, C212, 213 L.P.F
Q136~138
TP26
Q132, 133 SYNC DETECT
TP25
Q123 INV
Q119 BUFF
Q120, 121 AMP
TP22
RET OUT A4
IC38(2/2) AMP
IC38(1/2) VOLTAGE FOLLOWER
Q122, C138 SAMPLE HOLD
Q140
Q141 INV
IC39(1/2) MONO MULTI
IC39(2/2) MONO MULTI
TP23
Q124 DC SHIFT

VA-28 BLOCK
CCU-360(UC1),(J1)
CCU-360P(AE1)

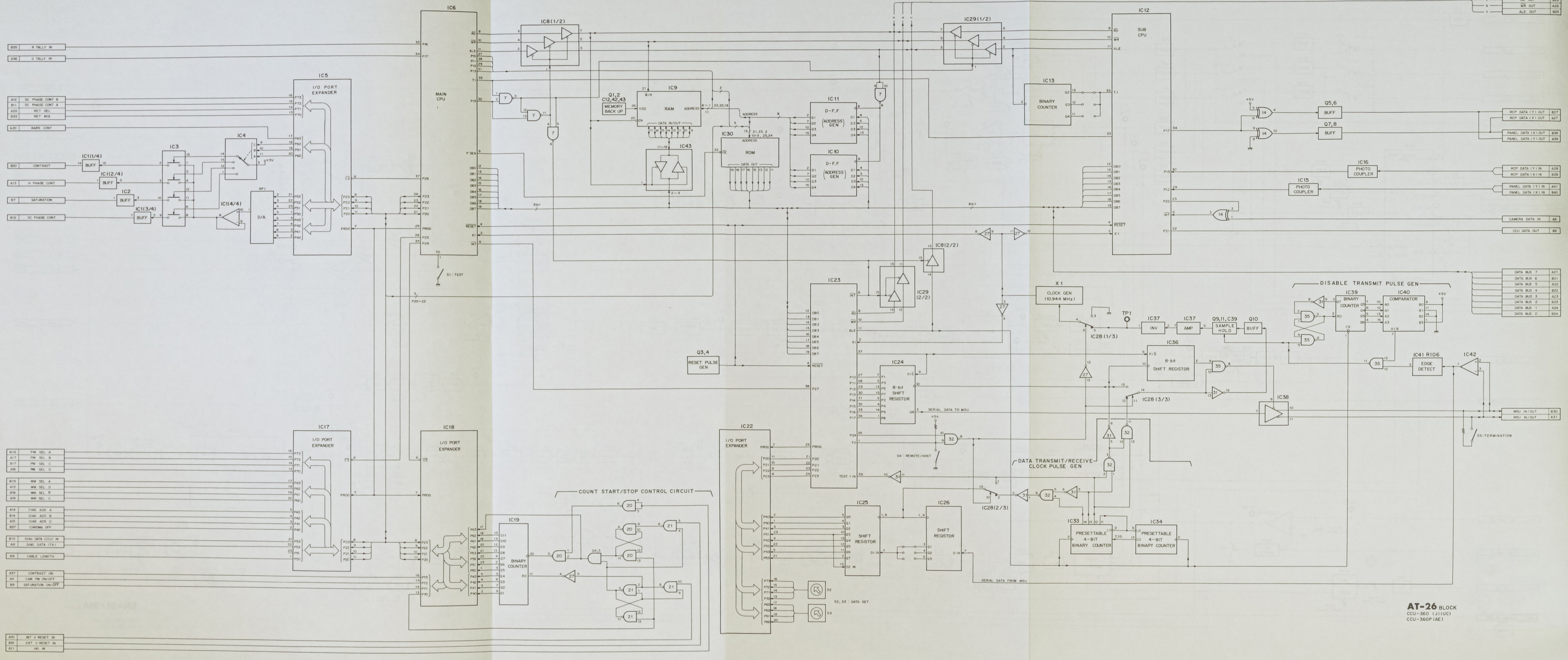
EN-31/31A BLOCK


A21 BLK IN
Q13 INV
A9 R IN
A10 G IN
A11 B IN
B16 CAM/BAR CONT IN
IC9
Q17 BUFF
Q18 BUFF
Q19 BUFF
IC8 COLOR BAR GEN
BLKG IN
INV 2 IN
INV 1 IN
H REF IN
BAR CK IN
EBU/95%
PAL/NTSC
R OUT
G OUT
B OUT
Y OUT
SETUP OUT
INV 2 OUT
Q OUT
I OUT
S1: CB MODE
SMPTE
EIA
A14 TEST CONT IN
Q12 INV
A23 HD IN
A29 BAR CLOCK IN
Q14 BUFF
RV7 R LEVEL
Q15 BUFF
RV8 G LEVEL
Q16 BUFF
RV9 B LEVEL
B14 CB R OUT
A15 CB G OUT
B15 CB B OUT
B21 SYNC IN
Q7 INV
Q1 BUFF
C7,8, LV1, R8 SYNC PHASE
Q2 BUFF
LV1 SYNC PHASE
Q42 INV DC SHIFT
B30 CONT ON/OFF
CONTRAST CONT IN
A31 SAT CONT IN
TP37
RV36 25V OFFSET
IC33(2/2)
TP36
Q94 DC SHIFT
B31 SAT ON/OFF
B22 BF IN
Q43 INV
RV20 BURST LEVEL
Q44 INV BUFF
RV21 BURST PHASE
A36 CHROMA ON/OFF
Q8 BUFF
Q6 BUFF
Q4 BUFF
IC4 AMP
B-Y MATRIX
RV6 B-Y LEVEL
CV2 B-Y FREQ
R-Y MATRIX
IC6 AMP
RV4 R-Y LEVEL
CV1 R-Y FREQ
TP3
TP4
Q20 BUFF
Q21 BUFF
Q22 BUFF
TP6
TP7
TP8
Y MATRIX
RV37 WHT LEVEL
IC11 AMP
RV41 Y LEVEL
IC12 AMP
Q23, C69 SAMPLE HOLD
TP9
RV2 Y LEVEL
RV40 SETUP LEVEL
RV1 SYNC LEVEL
IC2 AMP
TP2
DL1 45nS DELAY
IC13 AMP
RV10 CONT MIX LEV
IC14 AMP
RV38 SETUP LEVEL
TP10
IC1 AMP
DL2 0.79μS DELAY
Q24 BUFF
Q25 BUFF
Q95 BIAS
TP17
Q28 BUFF
Q29~31 KNEE
Q27 BUFF
RV17 KNEE POINT
RV16 OFFSET
TP16
TP15
IC19 Y MIX SIG GEN
RV18 OFFSET
Q32,33 BUFF
Q34,35,41 DIF AMP
Q36 BUFF
Q37,38,92 LIMIT
C115,116, L22 L.P.F
RV19 CHROMA LIMIT
Q39 BUFF
TP18
Q40, C117 SAMPLE HOLD
IC20 AMP
TP1
Q3 INV
IC25
Q47~49 I(V) MATRIX
Q50 BUFF
IC38 AMP
IC24 AMP
Q51, C153 SAMPLE HOLD
TP23
RV27 I(V) OFFSET
TP25
IC26 I(V) MIX SIG GEN
Q52,53 BUFF
Q54,55,79 DIF AMP
Q56 BUFF
TP26
RV29 I(V) MIX LEVEL
RV28 I(V) LEVEL
IC27 AMP
TP27
L33 C169,178 L.P.F
Q57
Q58
Q59 BUFF
DL4 3.58nS DELAY
L35, C181 L.P.F
Q60 BUFF
Q61 AMP
pouze pro NTSC
Q64 INV
Q65 INV
Q66 INV
Q67 INV
S3 I(V) ON/OFF
S4 Q(U) ON/OFF
Q83 BUFF
Q69~71 Q(U) MATRIX
Q72 BUFF
IC36 AMP
IC29 AMP
Q73, C203 SAMPLE HOLD
TP29
DL5 15nS DELAY
TP31
RV32 Q(U) OFFSET
IC30 Q(U) MIX SIG GEN
Q74,75 BUFF
Q76~78 DIF AMP
Q80 BUFF
TP33
RV34 Q(U) MIX LEVEL
IC31 AMP
TP34
L41 C215~217 L.P.F
Q81
Q82
Q26 BUFF
D10, C86 RECT
IC33(1/2)
Q68
IC23 AMP
TP22
RV26 RV Y LEVEL
RV14 VBS SYNC LEVEL
RV13 VBS FREQ ADJ
RV11 VBS CHROMA LEVEL
IC15 AMP
RV12 VBS LEVEL
IC16 AMP
IC17 AMP
IC18 AMP
TP14
TP11
TP12
TP13
RV24 VB/VBS FREQ ADJ
RV22 VB/VBS CHROMA LEVEL
RV25 VB/VBS SYNC LEVEL
IC21 AMP
RV23 VB/VBS LEVEL
S2: VB/VBS
IC22 AMP
TP21
TP5
Q11 BUFF
C45,46, LV2 SYNC PHASE
LV2 DL SYNC PHASE
Q10 BUFF
Q9 INV
TP20
Q45 INV DC SHIFT
Q62 BUFF
IC39 AMP
IC28 AMP
Q63, C186 SAMPLE HOLD
RV30 I(V) BLACK BAL
TP28
Q84 AMP
Q85 BUFF
IC37 AMP
IC32 AMP
Q86, C225 SAMPLE HOLD
RV35 Q(U) BLACK BAL
TP35
IC34
I(V) MOD
Q(U) MOD
PHASE ALT
AMP
RV39 CHROMA LEVEL
Q90 BUFF
C242~245 L46,47 B.P.F
Q91 BUFF
TP40
TP38
Q87 BUFF
TP39
Q89 BUFF
LV3 C236,237 SC PHASE
Q88 BUFF
LV3 SC PHASE
B-Y OUT A7
R-Y OUT A6
Y OUT A4
DIAG DATA(EN) OUT A18
Y (RV) OUT B13
VBS OUT B34
VBS 1 OUT B37
VBS 2 OUT B38
VBS 3 OUT B39
VB/VBS OUT A41
DL SYNC IN B23
L ALT IN A28
SC IN B32

EN-31/31A BLOCK

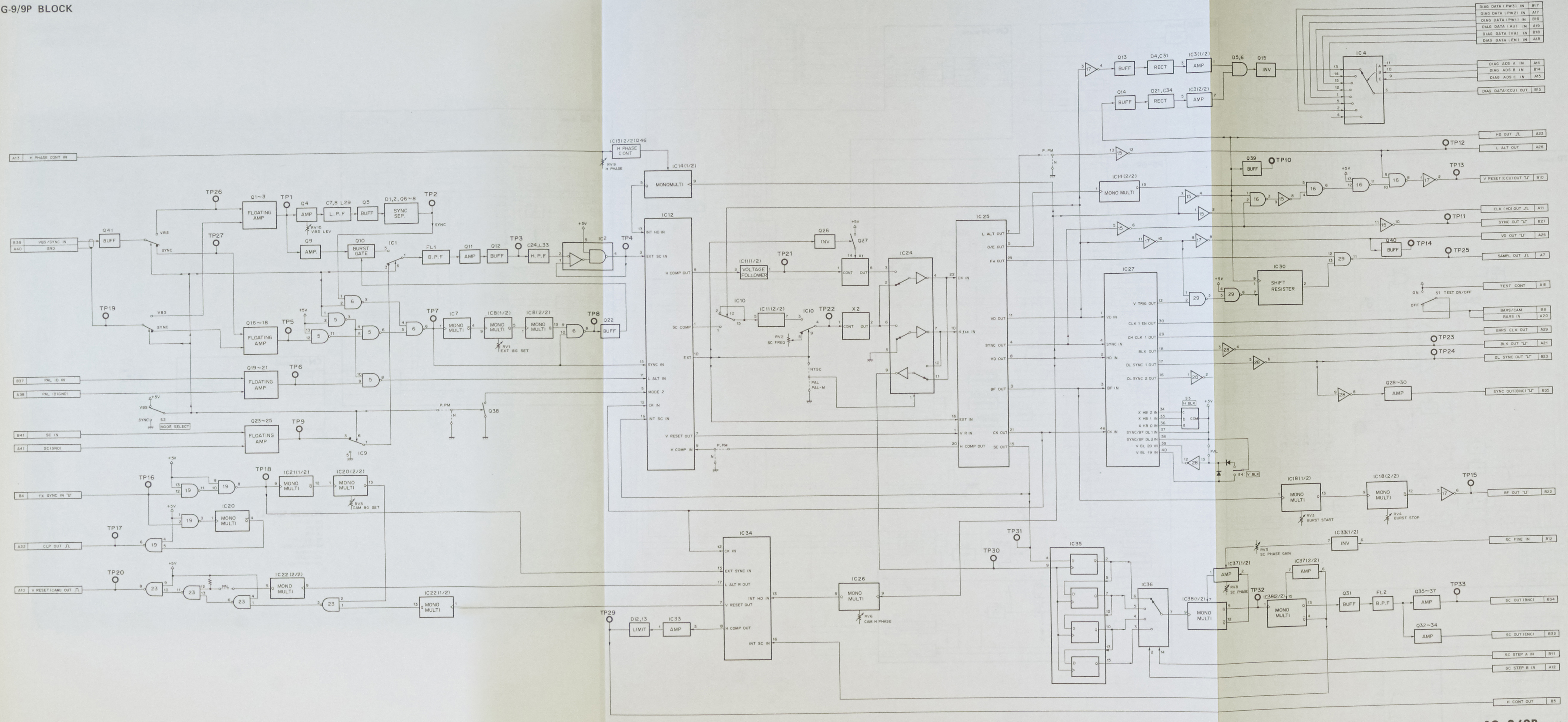
CCU-360 (UC)(J)
CCU-360P (AE)

AT-26 BLOCK

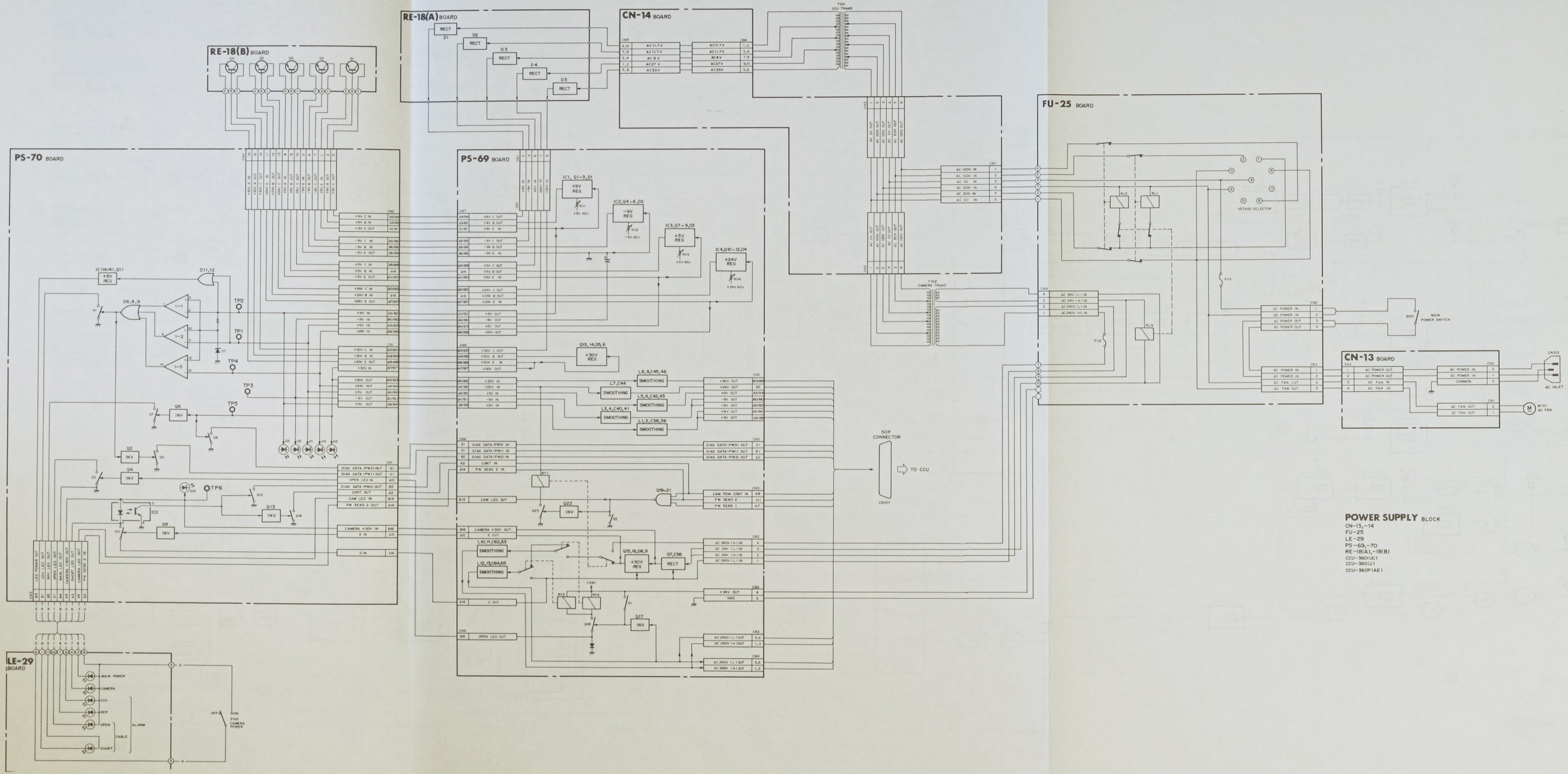

B35 R TALLY IN
A36 G TALLY IN
A12 SC PHASE CONT B
B11 SC PHASE CONT A
A33 RET SEL
B33 RET MIX
A20 BARS CONT
B20 CONTRAST
A13 H PHASE CONT
B7 SATURATION
B12 SC PHASE CONT
IC1(1/4) BUFF
IC1(2/4) BUFF
IC1(3/4) BUFF
IC1(4/4)
IC2 BUFF
IC3
IC4
RP1
D/A
IC5 I/O PORT EXPANDER
IC6 MAIN CPU
S1 : TEST
IC8(1/2)
Q1,2 C12,42,43 MEMORY BACK UP
IC9 RAM
DATA IN/OUT
ADDRESS
IC43
IC30 ROM
DATA OUT
IC11 D-F.F (ADDRESS) GEN
IC10 D-F.F (ADDRESS) GEN
IC29(1/2)
IC13 BINARY COUNTER
IC12 SUB CPU
Q5,6 BUFF
Q7,8 BUFF
IC16 PHOTO COUPLER
IC15 PHOTO COUPLER
RD OUT B26
WR OUT A26
ALE OUT B25
RCP DATA (Y) OUT B27
RCP DATA (X) OUT A27
PANEL DATA (X) OUT B38
PANEL DATA (Y) OUT A39
RCP DATA (Y) IN A29
RCP DATA (X) IN B28
PANEL DATA (Y) IN A41
PANEL DATA (X) IN B40
CAMERA DATA IN A6
CCU DATA OUT B6
IC8(2/2)
IC29 (2/2)
IC23
Q3,4 RESET PULSE GEN
P20~22
IC24 8-bit SHIFT REGISTOR
SERIAL DATA TO MSU
S4 : REMOTE/HOST
X1 CLOCK GEN (10.944 MHz)
TP1
IC28 (1/3)
IC37 INV
IC37 AMP
Q9,11,C39 SAMPLE HOLD
Q10 BUFF
IC36 8-bit SHIFT REGISTOR
IC28 (3/3)
DISABLE TRANSMIT PULSE GEN
IC39 BINARY COUNTER
IC40 COMPARATOR
IC41 R106 EDGE DETECT
IC42
IC38
DATA BUS 7 A21
DATA BUS 6 B21
DATA BUS 5 A22
DATA BUS 4 B22
DATA BUS 3 A23
DATA BUS 2 B23
DATA BUS 1 A24
DATA BUS 0 B24
MSU IN/OUT B30
MSU IN/OUT A31
S5:TERMINATION
DATA TRANSMIT/RECEIVE CLOCK PULSE GEN
IC28(2/3)
IC25 SHIFT REGISTOR
IC26 SHIFT REGISTOR
IC33 PRESETTABLE 4-BIT BINARY COUNTER
IC34 PRESETTABLE 4-BIT BINARY COUNTER
SERIAL DATA FROM MSU
IC22 I/O PORT EXPANDER
S2, S3 : DATA SET
S2
S3
IC17 I/O PORT EXPANDER
IC18 I/O PORT EXPANDER
IC19 BINARY COUNTER
COUNT START/STOP CONTROL CIRCUIT
B16 PM SEL A
A17 PM SEL B
B17 PM SEL C
A16 PM SEL D
B19 WM SEL A
A13 WM SEL D
B18 WM SEL B
A19 WM SEL C
A14 DIAG ADS A
B14 DIAG ADS B
A15 DIAG ADS C
B37 CHROMA OFF
B15 DIAG DATA (CCU) IN
A9 DIAG DATA (TX)
B8 CABLE LENGTH
A37 CONTRAST ON
A4 CAM PW ON/OFF
B9 SATURATION ON/OFF
A10 INT V RESET IN
B10 EXT V RESET IN
A11 HD IN

AT-26 BLOCK
CCU-360 (J)(UC)
CCU-360P (AE)

SG-9/9P BLOCK

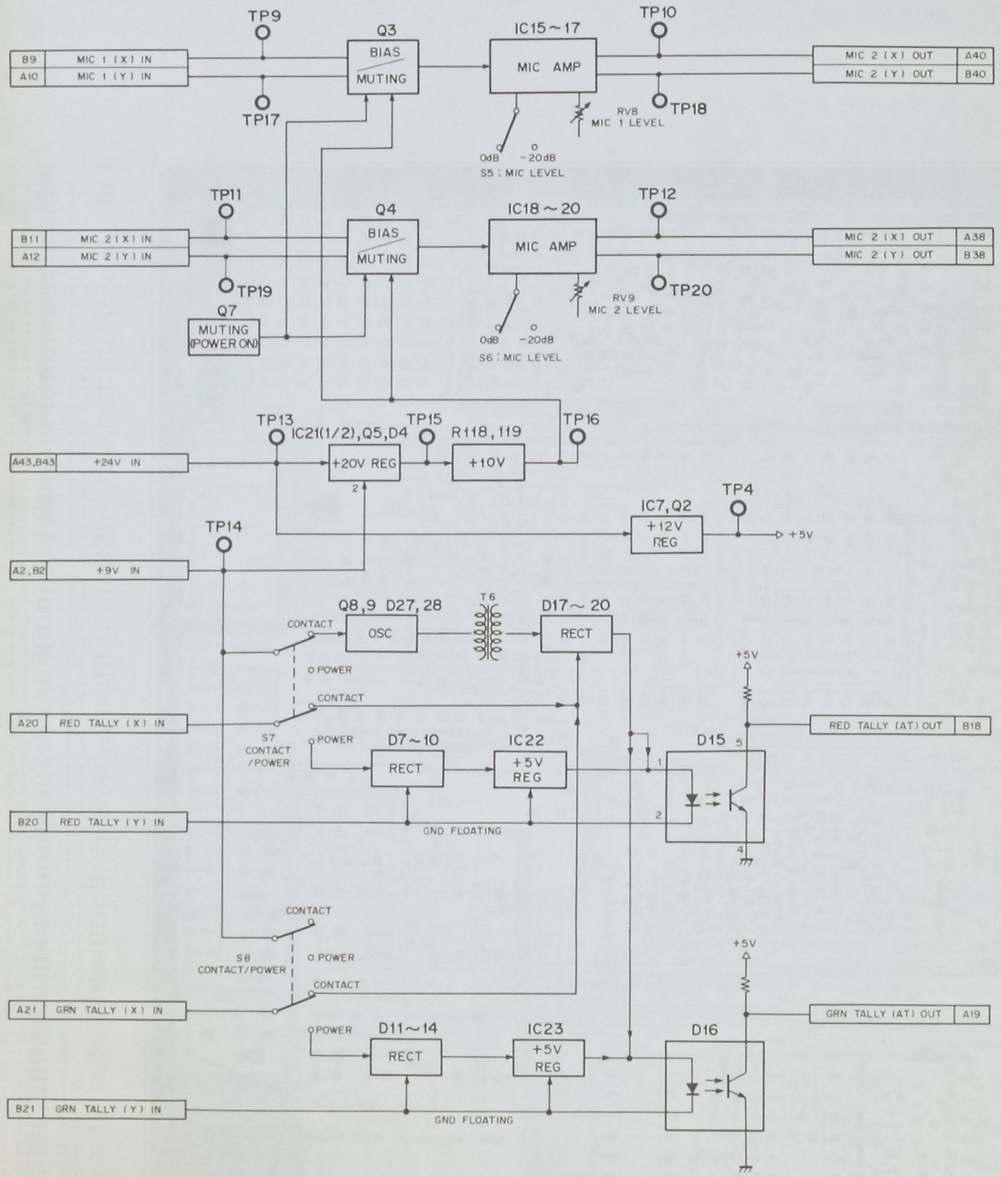

A13 H PHASE CONT IN
B39 VBS/SYNC IN
A40 GND
B37 PAL ID IN
A38 PAL ID(GND)
B41 SC IN
A41 SC(GND)
B4 TX SYNC IN
A22 CLP OUT
A10 V RESET(CAM) OUT
Q41 BUFF
TP19
TP26
TP27
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP16
TP17
TP18
TP20
Q1~3 FLOATING AMP
Q4 AMP
RV10 VBS LEV
C7,8 L29 L.P.F
Q5 BUFF
D1,2, Q6~8 SYNC SEP.
Q9 AMP
Q10 BURST GATE
IC1
FL1 B.P.F
Q11 AMP
Q12 BUFF
C24,L33 H.P.F
IC2
Q16~18 FLOATING AMP
Q19~21 FLOATING AMP
Q23~25 FLOATING AMP
IC7 MONO MULTI
IC8(1/2) MONO MULTI
IC8(2/2) MONO MULTI
RV1 EXT BS SET
Q22 BUFF
S2 MODE SELECT
Q38
IC9
IC21(1/2) MONO MULTI
IC20(2/2) MONO MULTI
RV3 CAM BS SET
IC20 MONO MULTI
IC22(2/2) MONO MULTI
IC22(1/2) MONO MULTI
IC13(2/2)Q46 H PHASE CONT
RV9 H PHASE
IC14(1/2) MONOMULTI
IC12
INT HD IN
EXT SC IN
H COMP OUT
SC COMP
EXT
SYNC IN
L ALT IN
MODE 2
CK IN
INT SC IN
V RESET OUT
H COMP IN
IC11(1/2) VOLTAGE FOLLOWER
TP21
Q26 INV
Q27
X1
IC10
IC11(2/2)
TP22
X2
RV2 SC FREQ
NTSC
PAL
PAL-M
IC24
IC25
L ALT OUT
O/E OUT
FH OUT
CK IN
VD OUT
SYNC OUT
HD OUT
BF OUT
EXT IN
V R IN
H COMP OUT
CK OUT
SC OUT
IC34
CK IN
EXT SYNC IN
L ALT R OUT
V RESET OUT
INT HD IN
H COMP OUT
INT SC IN
TP29
D12,13 LIMIT
IC33 AMP
IC26 MONO MULTI
RV6 CAM H PHASE
TP30
TP31
IC35
IC36
Q13 BUFF
D4,C31 RECT
IC3(1/2) AMP
Q14 BUFF
D21,C34 RECT
IC3(2/2) AMP
D5,6
Q15 INV
IC4
IC14(2/2) MONO MULTI
Q39 BUFF
TP10
TP11
TP12
TP13
TP14
TP15
TP23
TP24
TP25
Q40 BUFF
IC30 SHIFT RESISTER
IC27
V TRIG OUT
CLK 1 EN OUT
CH CLK 1 OUT
BLK OUT
DL SYNC 1 OUT
DL SYNC 2 OUT
VD IN
SYNC IN
HD IN
BF IN
CK IN
S3 H BLK
S4 V BLK
Q28~30 AMP
IC18(1/2) MONO MULTI
RV3 BURST START
IC18(2/2) MONO MULTI
RV4 BURST STOP
IC33(1/2) INV
RV3 SC PHASE GAIN
IC37(1/2) AMP
IC37(2/2) AMP
RV9 SC PHASE
TP32
IC38(1/2) MONO MULTI
IC38(2/2) MONO MULTI
Q31 BUFF
FL2 B.P.F
Q35~37 AMP
Q32~34 AMP
TP33
DIAG DATA (PW3) IN B17
DIAG DATA (PW2) IN A17
DIAG DATA (PW1) IN B16
DIAG DATA (AU) IN A19
DIAG DATA (VA) IN B18
DIAG DATA (EN) IN A18
DIAG ADS A IN A14
DIAG ADS B IN B14
DIAG ADS C IN A15
DIAG DATA(CCU) OUT B15
HD OUT A23
L ALT OUT A28
V RESET(CCU) OUT B10
CLK (HD) OUT A11
SYNC OUT B21
VD OUT A24
SAMPL OUT A7
TEST CONT A8
S1 TEST ON/OFF
BARS/CAM B8
BARS IN A20
BARS CLK OUT A29
BLK OUT A21
DL SYNC OUT B23
SYNC OUT(BNC) B35
BF OUT B22
SC FINE IN B12
SC OUT (BNC) B34
SC OUT (ENC) B32
SC STEP A IN B11
SC STEP B IN A12
H CONT OUT B5

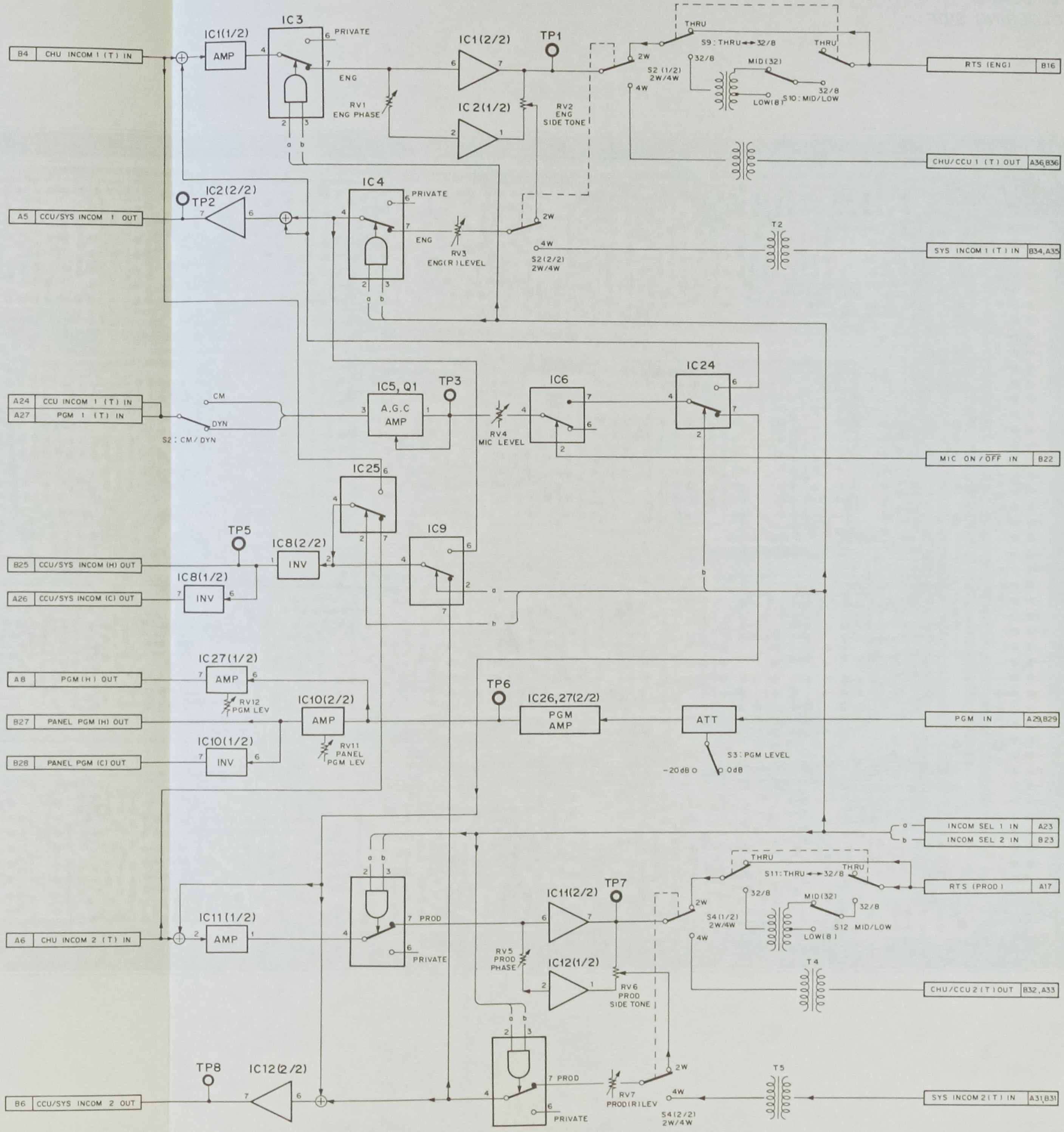
SG-9/9P BLOCK
CCU-360 (J, UC)
CCU-360P (AE)


RE-18(A) BOARD
RE-18(B) BOARD
CN-14 BOARD
PS-70 BOARD
PS-69 BOARD
FU-25 BOARD
CN-13 BOARD
LE-29 BOARD
RECT
+9V REG
-9V REG
+5V REG
+24V REG
+30V REG
SMOOTHING
INV
VOLTAGE SELECTOR
50P CONNECTOR
TO CCU
MAIN POWER SWITCH
AC INLET
AC FAN
TP1
TP2
TP3
TP4
TP5
TP6

POWER SUPPLY BLOCK
CN-13,-14
FU-25
LE-29
PS-69,-70
RE-18(A),-18(B)
CCU-360(UC)
CCU-360(J)
CCU-360P(AE)

AU-58 BLOCK


TP9
Q3
IC15～17
TP10
B9 | MIC 1 (X) IN
A10 | MIC 1 (Y) IN
BIAS
MUTING
MIC AMP
MIC 2 (X) OUT | A40
MIC 2 (Y) OUT | B40
TP17
TP18
RV8
MIC 1 LEVEL
0dB
-20dB
S5 : MIC LEVEL
TP11
Q4
IC18～20
TP12
B11 | MIC 2 (X) IN
A12 | MIC 2 (Y) IN
MIC 2 (X) OUT | A38
MIC 2 (Y) OUT | B38
TP19
TP20
Q7
MUTING (POWER ON)
RV9
MIC 2 LEVEL
S6 : MIC LEVEL
TP13
IC21(1/2),Q5,D4
TP15
R118, 119
TP16
A43,B43 | +24V IN
+20V REG
+10V
IC7,Q2
TP4
+12V REG
+5V
TP14
A2, B2 | +9V IN
Q8,9 D27,28
T6
D17～20
CONTACT
OSC
RECT
POWER
A20 | RED TALLY (X) IN
S7
CONTACT /POWER
D7～10
IC22
+5V REG
D15
RED TALLY (AT) OUT | B18
B20 | RED TALLY (Y) IN
GND FLOATING
S8
CONTACT/POWER
A21 | GRN TALLY (X) IN
D11～14
IC23
D16
GRN TALLY (AT) OUT | A19
B21 | GRN TALLY (Y) IN


B4 | CHU INCOM 1 (T) IN
IC1(1/2)
AMP
IC3
PRIVATE
ENG
IC1(2/2)
TP1
RV1
ENG PHASE
IC2(1/2)
RV2
ENG
SIDE TONE
THRU
S9 : THRU ↔ 32/8
2W
4W
S2 (1/2)
2W/4W
32/8
MID(32)
LOW(8)
S10 : MID/LOW
RTS (ENG) | B16
CHU/CCU 1 (T) OUT | A36,B36
A5 | CCU/SYS INCOM 1 OUT
TP2
IC2(2/2)
IC4
RV3
ENG(R)LEVEL
S2(2/2)
2W/4W
T2
SYS INCOM 1 (T) IN | B34,A35
A24 | CCU INCOM 1 (T) IN
A27 | PGM 1 (T) IN
CM
DYN
S2 : CM/DYN
IC5, Q1
A.G.C AMP
TP3
RV4
MIC LEVEL
IC6
IC24
MIC ON/OFF IN | B22
IC25
TP5
IC8(2/2)
INV
IC9
B25 | CCU/SYS INCOM (H) OUT
IC8(1/2)
A26 | CCU/SYS INCOM (C) OUT
IC27(1/2)
A8 | PGM (H) OUT
RV12
PGM LEV
IC10(2/2)
B27 | PANEL PGM (H) OUT
RV11
PANEL
PGM LEV
IC10(1/2)
B28 | PANEL PGM (C) OUT
TP6
IC26,27(2/2)
PGM AMP
ATT
PGM IN | A29,B29
S3 : PGM LEVEL
-20dB
0dB
INCOM SEL 1 IN | A23
INCOM SEL 2 IN | B23
S11 : THRU ↔ 32/8
RTS (PROD) | A17
IC11(2/2)
TP7
S4(1/2)
2W/4W
S12 MID/LOW
A6 | CHU INCOM 2 (T) IN
IC11(1/2)
PROD
RV5
PROD
PHASE
IC12(1/2)
RV6
PROD
SIDE TONE
T4
CHU/CCU 2 (T) OUT | B32,A33
TP8
IC12(2/2)
B6 | CCU/SYS INCOM 2 OUT
RV7
PROD(R)LEV
S4(2/2)
2W/4W
T5
SYS INCOM 2 (T) IN | A31,B31

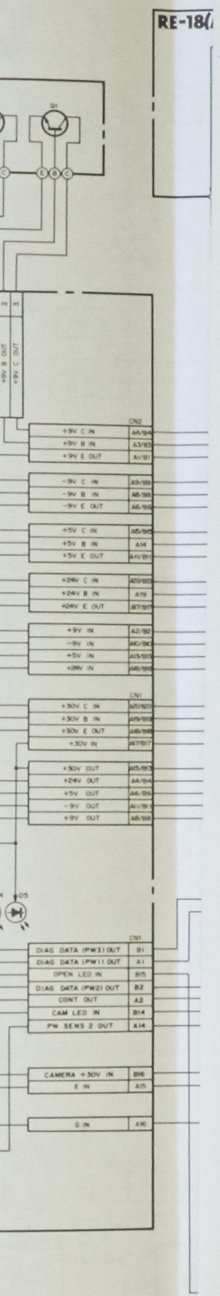
AU-58 BLOCK

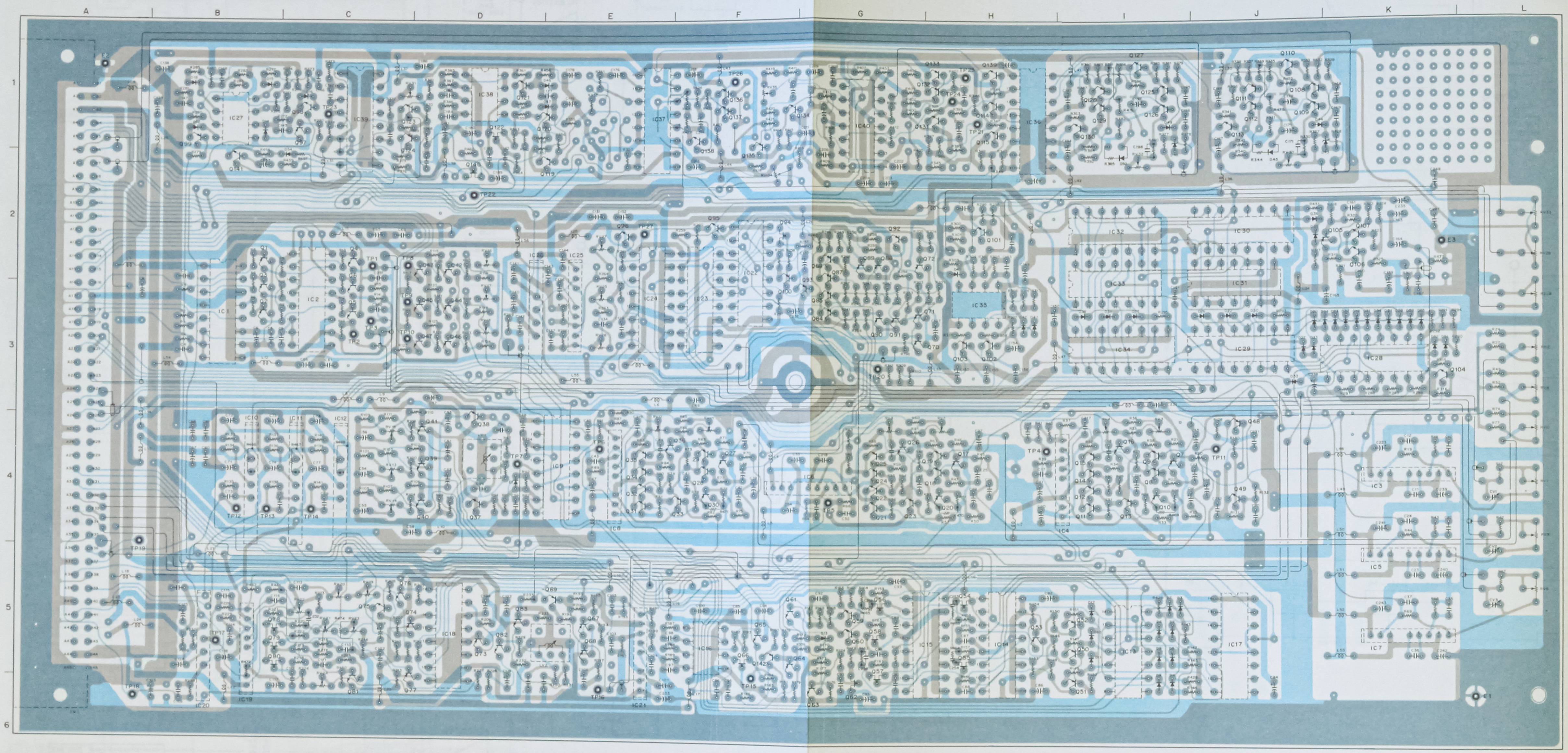
CCU-360 (J,UC)
CCU-360P (AE)

6-2. MOUNTING AND SCHEMATIC DIAGRAMS

VA-28 BOARD

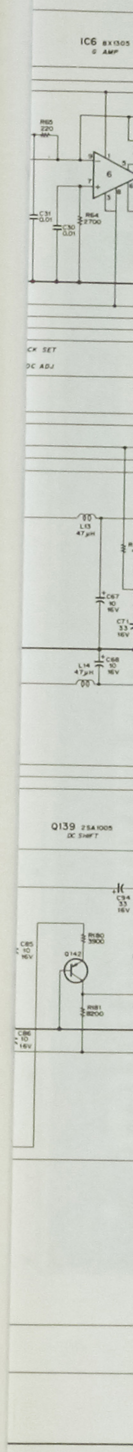
– SOLDERING SIDE –



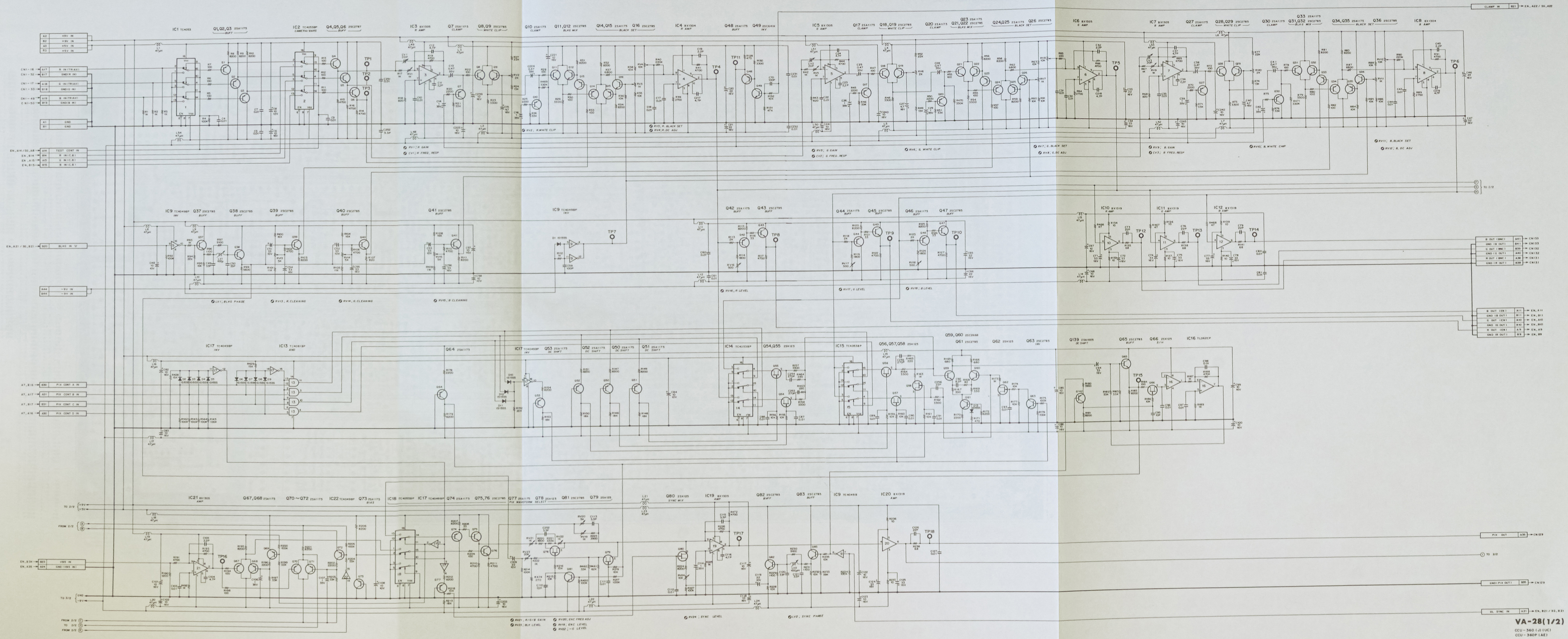


VA-28 BOARD
–SOLDERING SIDE–
1-615-203-11
CCU-360 (UC, J)
CCU-360P (AE)

CN1	A-1
CV1	L-4
CV2	L-5
CV3	L-5
D1	D-4
D2	I-5
D3	I-5
D4	I-5
D5	I-5
D6	I-5
D7	I-5
D8	I-5
D9	I-5
D10	I-5
D11	I-5
D12	I-5
D13	G-5
D14	B-1
D15	B-1
D16	C-1
D17	B-1
D18	B-1
D19	K-3
D20	J-3
D21	K-3
D22	J-3
D23	K-3
D24	K-3
D25	K-3
D26	J-3
D27	J-3
D28	K-3
D29	K-3
D30	J-3
D31	K-3
D32	K-3
D33	J-3
D34	K-3
D35	J-2
D36	J-2
D37	I-3
D38	I-3
D39	I-3
D40	H-2
D41	H-3
D42	H-3
D43	K-1
D44	J-1
D45	J-1
D46	E-1
D47	E-1
D48	I-1
D49	I-1
D50	I-1
D51	K-3
D52	K-3
D53	J-3
D54	C-2
E1	L-6
E2	A-1
E3	K-2
IC1	B-3
IC2	C-3
IC3	K-4
IC4	I-4
IC5	K-5
IC6	G-4
IC7	K-5
IC8	E-4
IC9	E-4
IC10	B-4
IC11	C-4
IC12	C-4
IC13	I-5
IC14	H-5
IC15	H-5
IC16	F-5
IC17	J-5
IC18	D-5
IC19	B-5
IC20	B-5
IC21	E-5
IC22	F-2
IC23	F-3
IC24	E-3
IC25	E-3
IC26	D-3
IC27	B-1
IC28	K-3
IC29	J-3
IC30	J-2
IC31	J-2
IC32	I-2
IC33	I-2
IC34	I-3
IC35	H-3
IC36	H-1
IC37	E-1
IC38	D-1
IC39	C-1
IC40	G-1
LV1	D-4
LV2	E-5
Q1	B-2
Q2	B-3
Q3	B-3
Q4	C-2
Q5	C-3
Q6	C-3
Q7	I-4
Q8	I-4
Q9	I-4
Q10	I-4
Q11	I-4
Q12	I-4
Q13	I-4
Q14	I-4
Q15	I-4
Q16	I-4
Q17	H-4
Q18	H-4
Q19	H-4
Q20	H-4
Q21	G-4
Q22	G-4
Q23	G-4
Q24	G-4
Q25	G-4
Q26	G-4
Q27	F-4
Q28	F-4
Q29	F-4
Q30	F-4
Q31	E-4
Q32	E-4
Q33	F-4
Q34	E-4
Q35	E-4
Q36	F-4
Q37	D-4
Q38	D-4
Q39	D-4
Q40	D-4
Q41	D-4
Q42	D-2
Q43	D-2
Q44	D-3
Q45	D-3
Q46	D-3
Q47	D-3
Q48	J-4
Q49	J-4
Q50	I-5
Q51	I-5
Q52	I-5
Q53	H-5
Q54	H-5
Q55	H-5
Q56	G-5
Q57	G-5
Q58	G-5
Q59	G-5
Q60	G-5
Q61	F-5
Q62	G-6
Q63	G-6
Q64	F-5
Q65	F-5
Q66	F-5
Q67	E-5
Q68	E-5
Q69	E-5
Q70	G-3
Q71	G-3
Q72	G-2
Q73	D-5
Q74	D-5
Q75	C-5
Q76	C-5
Q77	D-5
Q78	B-5
Q79	B-5
Q80	B-5
Q81	C-6
Q82	D-5
Q83	D-5
Q84	G-3
Q85	G-3
Q86	G-2
Q87	G-2
Q88	G-2
Q89	G-2
Q90	G-3
Q91	G-3
Q92	G-2
Q93	G-3
Q94	F-2
Q95	F-2
Q96	E-2
Q97	C-1
Q98	C-1
Q99	B-1
Q100	F-2
Q101	H-2
Q102	H-3
Q103	H-3
Q104	K-3
Q105	K-2
Q106	K-2
Q107	K-2
Q108	J-1
Q109	J-1
Q110	J-1
Q111	J-1
Q112	J-1
Q113	J-1
Q114	H-1
Q115	H-1
Q119	E-2
Q120	E-1
Q121	D-1
Q122	D-1
Q123	C-1
Q124	C-1
Q125	I-1
Q126	I-1
Q127	I-1
Q128	I-1
Q129	I-1
Q130	I-1
Q131	H-1
Q132	H-1
Q133	H-1
Q134	F-1
Q135	F-1
Q136	F-1
Q137	F-1
Q138	F-1
Q139	H-1
Q140	D-2
Q141	B-2
Q142	F-5
RV1	L-4
RV2	L-3
RV3	I-4
RV4	I-4
RV5	L-4
RV6	L-3
RV7	H-4
RV8	G-4
RV9	L-5
RV10	L-4
RV11	F-4
RV12	E-4
RV13	C-4
RV14	C-4
RV15	C-4
RV16	D-2
RV17	D-3
RV18	D-3
RV19	C-5
RV20	C-5
RV21	C-5
RV22	C-5
RV23	C-5
RV24	C-6
RV25	E-3
RV26	E-3
RV27	E-2
RV28	L-3
RV29	L-2
RV30	J-2
RV31	C-1
RV32	I-2
RV33	L-2
RV34	F-2
RV35	F-1
TP1	C-2
TP2	C-3
TP3	C-3
TP4	H-4
TP5	G-4
TP6	E-4
TP7	D-4
TP8	C-2
TP9	C-3
TP10	C-3
TP11	J-4
TP12	B-4
TP13	B-4
TP14	C-4
TP15	F-5
TP16	E-6
TP17	B-5
TP18	A-6
TP19	A-4
TP20	G-3
TP21	H-1
TP22	D-2
TP23	C-1
TP24	H-1
TP25	H-1
TP26	F-1
TP27	E-2



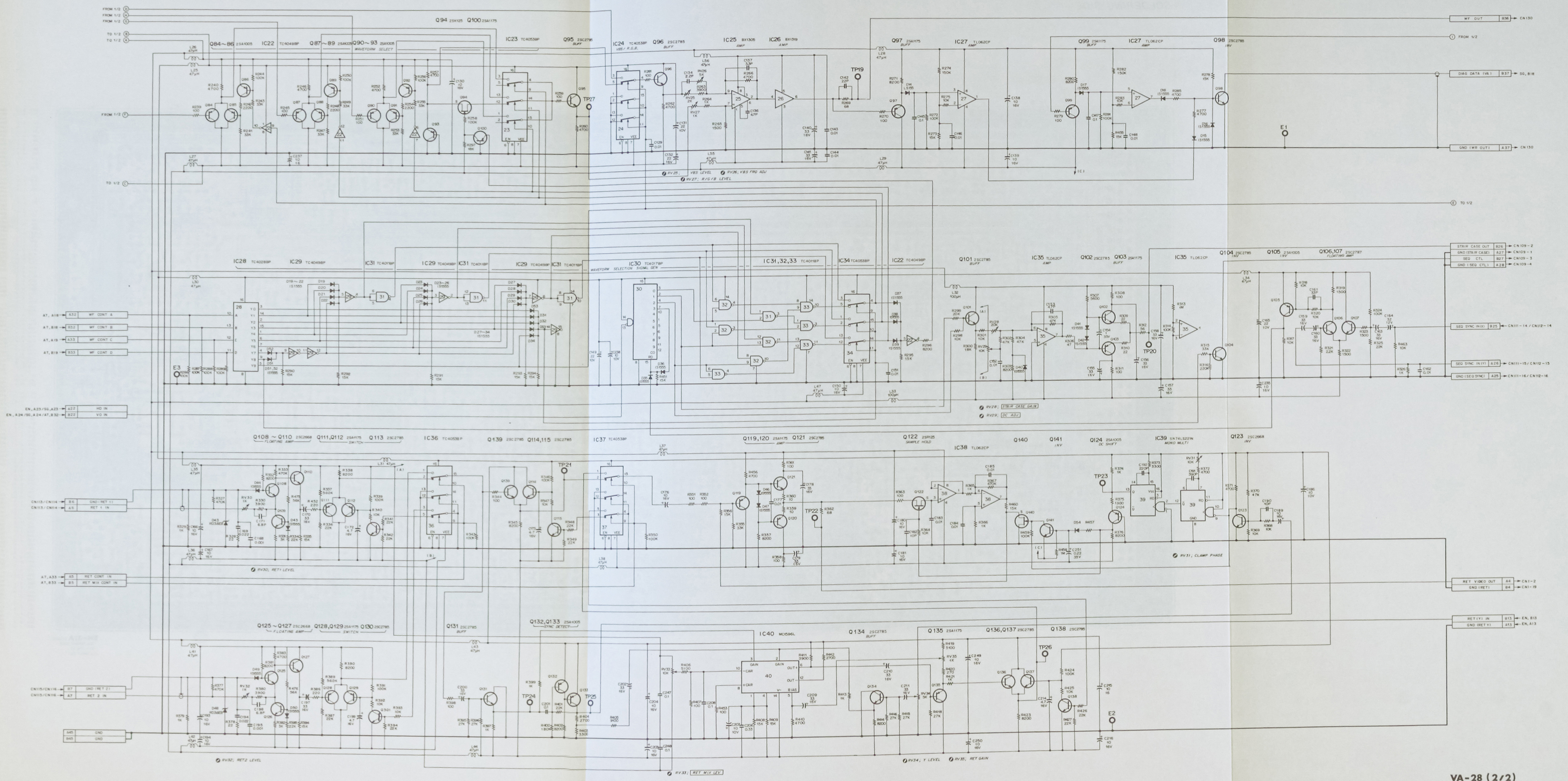
VA-28 BOARD(1/2)


IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
GND(PIX OUT)
B35
CN129
DL SYNC IN
A21
EN, B21 / SG, B21

VA-28(1/2)

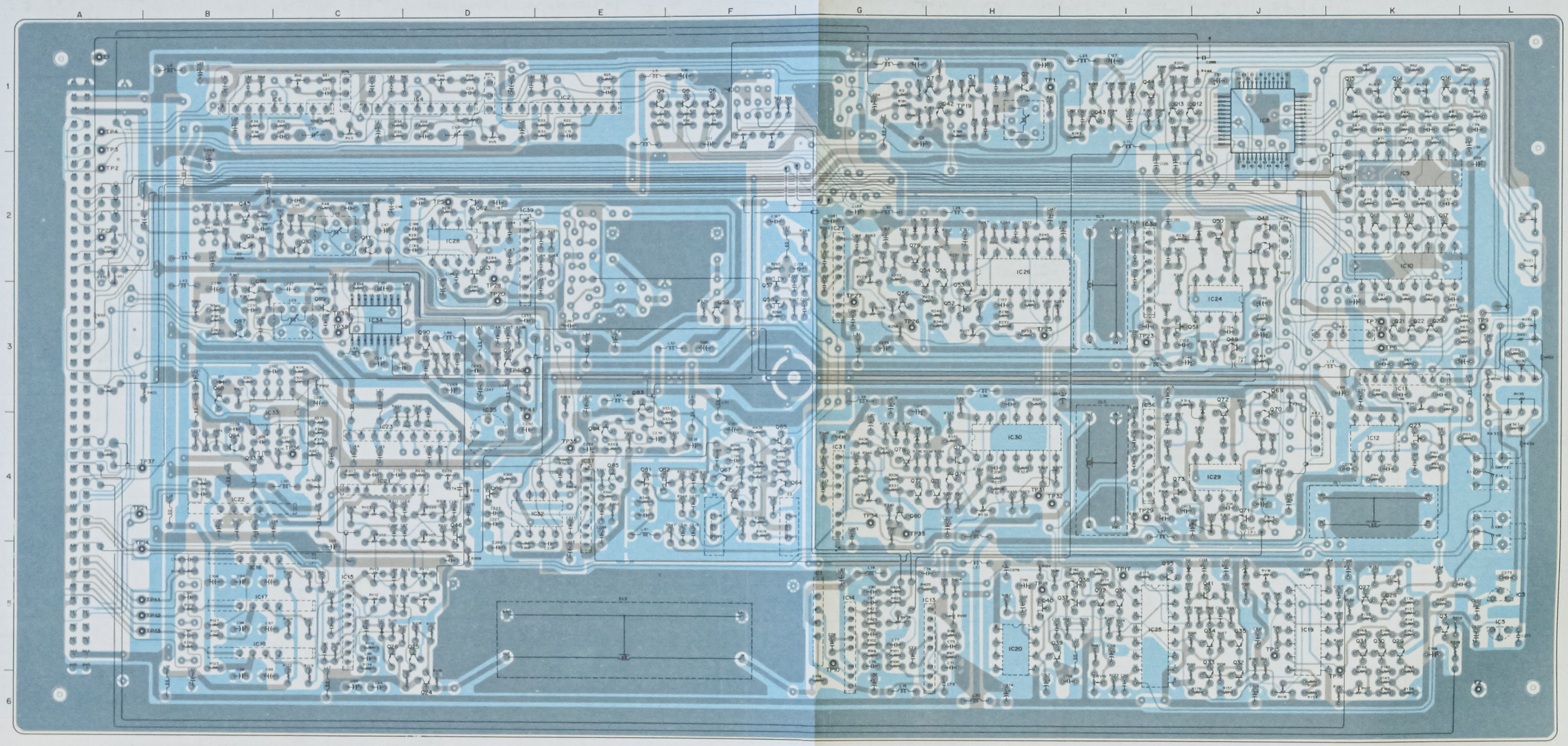
CCU-360 (J)(UC)
CCU-360P (AE)

VA-28 BOARD(2/2)


FROM 1/2
TO 1/2
Q84~86 2SA1005
IC22 TC4049BP
Q87~89 2SB1005
Q90~93 2SA1005
WAVEFORM SELECT
Q94 2SK125
Q100 2SA1175
IC23 TC4053BP
Q95 2SC2785
BUFF
TP27
IC24 TC4053BP
VBS / R.G.B.
Q96 2SC2785
BUFF
IC25 BX1305
AMP
IC26 BX1319
AMP
TP19
Q97 2SA1175
BUFF
IC27 TL062CP
AMP
Q99 2SA1175
BUFF
IC27 TL062CP
AMP
Q98 2SC2785
INV
E1
RV25, VBS LEVEL
RV26, VBS FRQ ADJ
RV27, R/G/B LEVEL
WF OUT
B36
CN130
FROM 1/2
DIAG DATA (VA)
B37
SG, B18
GND (WR OUT)
A37
CN130
TO 1/2
IC28 TC4028BP
IC29 TC4049BP
IC31 TC4011BP
IC29 TC4049BP
IC31 TC4011BP
IC29 TC4049BP
IC31 TC4011BP
IC30 TC4017BP
WAVEFORM SELECTION SIGNAL GEN
IC31,32,33 TC4011BP
IC34 TC4053BP
IC22 TC4049BP
Q101 2SC2785
BUFF
IC35 TL062CP
AMP
Q102 2SC2785
Q103 2SA1175
BUFF
IC35 TL062CP
Q104 2SC2785
INV
Q105 2SA1005
INV
Q106,107 2SC2787
FLOATING AMP
TP20
E3
AT, A18
A32
WF CONT A
AT, B18
B32
WF CONT B
AT, A19
A33
WF CONT C
AT, B19
B33
WF CONT D
EN, A23 / SG, A23
A22
HD IN
EN, A24 / SG, A24 / AT, B32
B22
VD IN
RV28, STAIR CASE GAIN
RV29, DC ADJ
STAIR CASE OUT
B26
CN109-2
GND (STAIR CASE)
A27
CN109-1
SEQ CTL
B27
CN109-3
GND (SEQ CTL)
A28
CN109-4
SEQ SYNC IN (X)
B25
CN111-14 / CN112-14
SEQ SYNC IN (Y)
A26
CN111-15 / CN112-15
GND (SEQ SYNC)
A25
CN111-16 / CN112-16
Q108~Q110 2SC2668
FLOATING AMP
Q111,Q112 2SA1175
SWITCH
Q113 2SC2785
IC36 TC4053BP
Q139 2SC2785
Q114,115 2SC2785
IC37 TC4053BP
TP21
Q119,120 2SA1175
AMP
Q121 2SC2785
TP22
Q122 2SK125
SAMPLE HOLD
IC38 TL062CP
Q140
Q141
INV
Q124 2SA1005
DC SHIFT
IC39 SN74LS221N
MONO MULTI
Q123 2SC2668
INV
TP23
RV30, RET1 LEVEL
RV31, CLAMP PHASE
CN113 / CN114
GND (RET 1)
RET 1 IN
AT, A35
AT, B35
RET CONT IN
RET MIX CONT IN
RET VIDEO OUT
A4
CN1-2
GND (RET)
B4
CN1-19
RET (Y) IN
B13
EN, B13
GND (RET Y)
A13
EN, A13
Q125~Q127 2SC2668
FLOATING AMP
Q128,Q129 2SA1175
SWITCH
Q130 2SC2785
Q131 2SC2785
BUFF
Q132,Q133 2SA1005
SYNC DETECT
IC40 MC1596L
Q134 2SC2785
BUFF
Q135 2SA1175
Q136,Q137 2SC2785
Q138 2SC2785
TP24
TP25
TP26
E2
CN115 / CN116
GND (RET 2)
RET 2 IN
GND
GND
RV32, RET2 LEVEL
RV33, RET MIX LEV
RV34, Y LEVEL
RV35, RET GAIN

VA-28 (2/2)
CCU-360(J)(UC)
CCU-360P(AE)

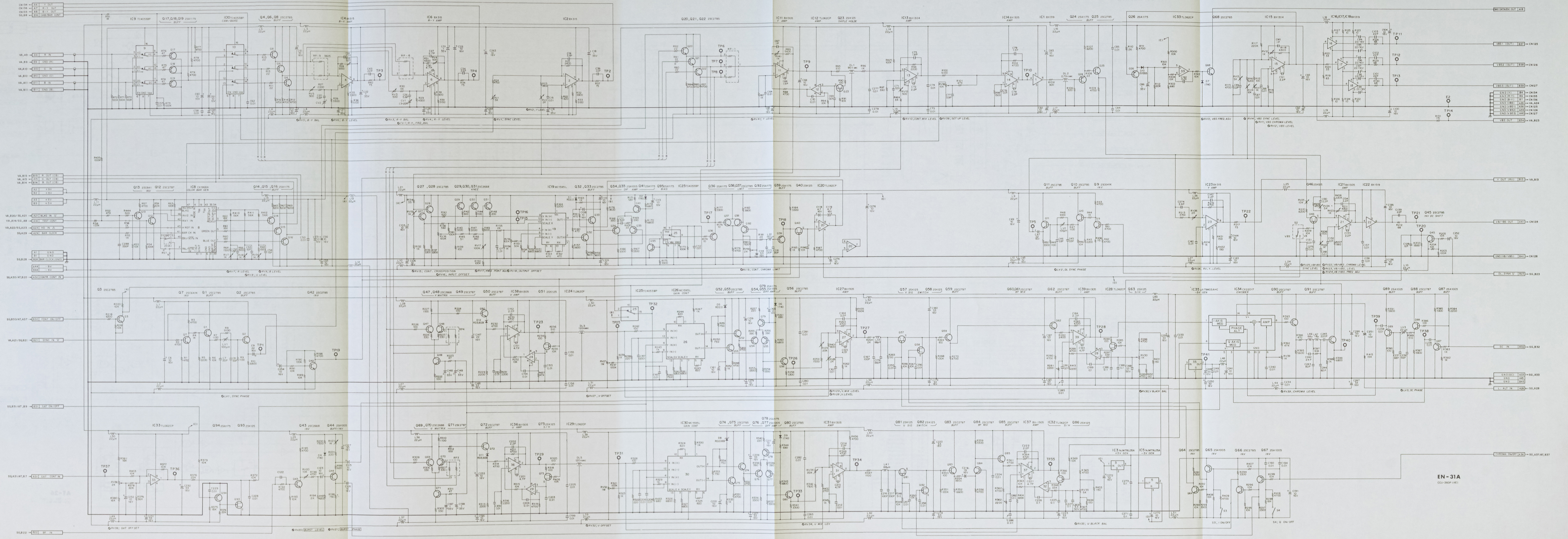
EN-31/31A BOARD
– SOLDERING SIDE –



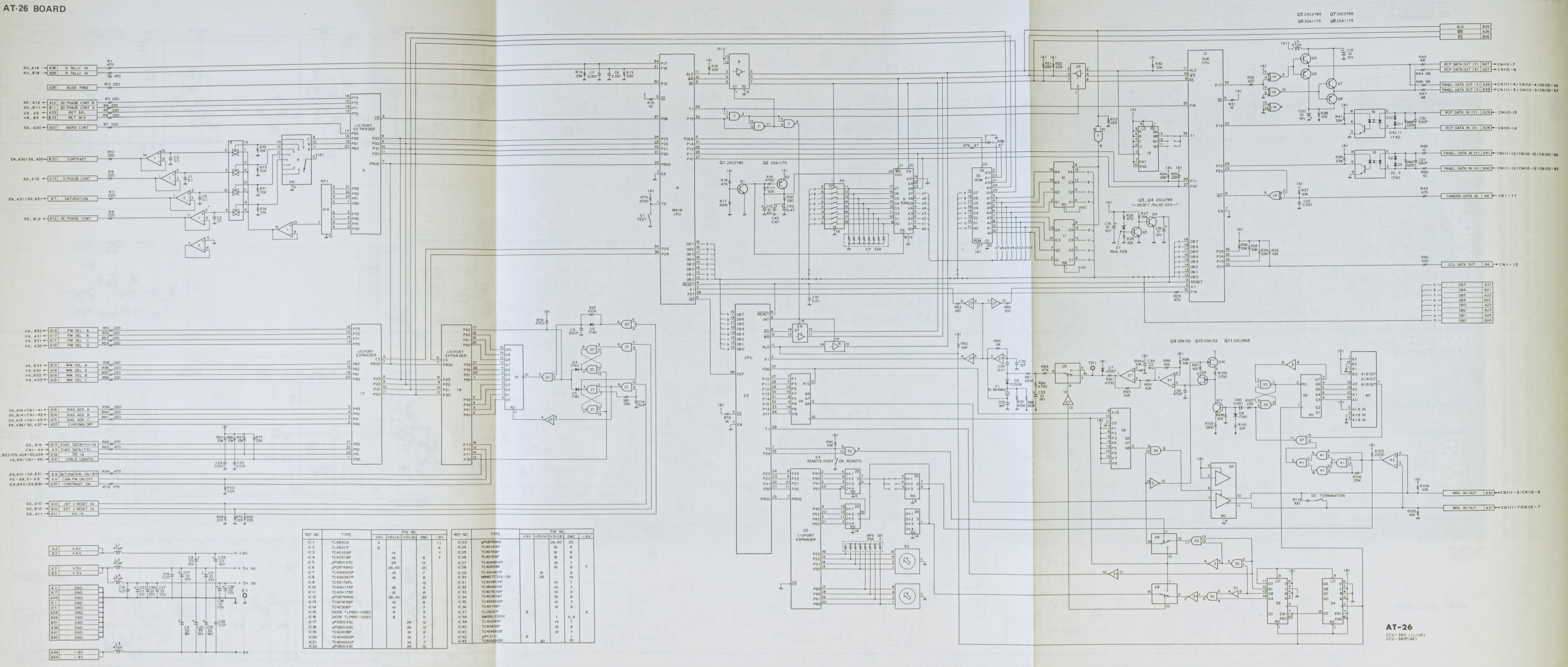
EN-31A BOARD
–SOLDERING SIDE–
1-615-204-21
CCU-360P (EK)

CV1	C - 1
CV2	D - 1
D1	J - 5
D2	J - 5
D4	I - 1
D5	H - 2
D6	G - 2
D7	B - 3
D8	G - 4
D9	G - 4
D10	C - 5
D11	J - 3
D12	J - 2
DL1	K - 4
DL2	E - 5
DL3	I - 2
DL5	I - 4
E1	A - 1
E2	L - 6
IC1	G - 5
IC2	E - 1
IC3	L - 5
IC4	D - 1
IC5	L - 5
IC6	B - 1
IC8	J - 1
IC9	K - 2
IC10	K - 2
IC11	K - 3
IC12	K - 4
IC13	H - 5
IC14	G - 5
IC15	C - 5
IC16	B - 5
IC17	B - 5
IC18	B - 5
IC19	J - 5
IC20	H - 5
IC21	C - 4
IC22	B - 4
IC23	C - 4
IC24	J - 3
IC25	I - 5
IC26	H - 2
IC27	G - 2
IC28	D - 2
IC29	J - 4
IC30	H - 4
IC31	G - 4
IC32	E - 4
IC33	C - 3
IC34	C - 3
IC35	D - 4
IC36	I - 4
IC37	E - 4
IC38	I - 2
LV1	H - 1
LV2	C - 2
LV3	C - 3
Q1	H - 1
Q2	H - 1
Q3	K - 5
Q4	E - 1
Q6	F - 1
Q7	H - 1
Q8	F - 1
Q9	B - 2
Q10	C - 2
Q11	C - 2
Q12	J - 1
Q13	I - 1
Q14	K - 1
Q15	K - 1
Q16	K - 1
Q17	K - 2
Q18	K - 2
Q19	K - 2
Q20	K - 3
Q21	K - 3
Q22	K - 3
Q23	K - 4
Q24	D - 6
Q25	D - 5
Q26	C - 5
Q27	K - 5
Q28	C - 5
Q28	K - 5
Q29	K - 5
Q30	K - 5
Q31	K - 5
Q32	J - 5
Q33	J - 5
Q34	J - 5
Q35	J - 5
Q36	I - 5
Q37	I - 5
Q38	I - 5
Q39	H - 5
Q40	H - 5
Q41	J - 5
Q42	H - 1
Q43	I - 1
Q44	I - 1
Q45	B - 2
Q46	D - 4
Q47	J - 2
Q48	J - 2
Q49	J - 3
Q50	J - 2
Q51	I - 3
Q52	H - 3
Q53	H - 2
Q54	G - 2
Q55	H - 3
Q56	G - 3
Q57	F - 3
Q58	F - 3
Q59	F - 3
Q62	D - 2
Q63	D - 2
Q64	F - 4
Q65	F - 4
Q66	F - 4
Q67	F - 4
Q68	B - 3
Q69	J - 3
Q70	J - 3
Q71	J - 4
Q72	J - 3
Q73	I - 4
Q74	H - 4
Q75	H - 4
Q76	H - 4
Q77	G - 4
Q78	G - 4
Q79	G - 2
Q80	G - 4
Q81	E - 4
Q82	F - 4
Q83	E - 3
Q84	E - 4
Q85	E - 4
Q86	D - 4
Q87	B - 3
Q88	B - 3
Q89	C - 3
Q90	D - 3
Q91	D - 3
Q92	I - 5
Q93	B - 4
Q94	B - 4
Q95	I - 5
RP1	K - 3
RP3	J - 4
RP4	J - 2
RP5	C - 1
RP6	D - 1
RV1	F - 1
RV2	F - 1
RV3	C - 1
RV4	C - 1
RV5	D - 1
RV6	D - 1
RV7	K - 1
RV8	K - 1
RV9	L - 1
RV10	H - 5
RV11	D - 5
RV12	C - 5
RV13	C - 5
RV14	D - 5
RV15	K - 5
RV16	J - 5
RV17	K - 6
RV18	J - 6
RV19	I - 6
RV20	L - 2
RV21	L - 2
RV22	C - 4
RV23	C - 4
RV24	D - 4
RV25	D - 4
RV26	D - 4
RV27	H - 3
RV28	G - 3
RV29	G - 3
RV30	L - 3
RV32	H - 4
RV34	G - 4
RV35	L - 3
RV37	K - 2
RV38	G - 5
RV39	L - 3
RV40	G - 1
RV41	K - 3
S1	L - 4
S2	L - 4
S3	F - 4
S4	F - 4
TP1	H - 1
TP2	A - 2
TP3	A - 1
TP4	A - 1
TP5	D - 2
TP6	K - 3
TP7	K - 3
TP8	K - 3
TP9	L - 3
TP10	G - 5
TP11	A - 5
TP12	A - 5
TP13	A - 5
TP14	A - 5
TP15	J - 5
TP16	K - 5
TP17	I - 5
TP18	H - 5
TP19	H - 1
TP20	D - 3
TP21	A - 4
TP22	A - 2
TP23	I - 3
TP25	H - 3
TP26	G - 3
TP27	G - 3
TP28	D - 2
TP29	I - 4
TP31	H - 4
TP32	H - 4
TP33	G - 4
TP34	G - 4
TP35	E - 4
TP36	C - 4
TP37	A - 4
TP38	C - 3
TP39	C - 3
TP40	D - 3
TP41	D - 4

EN-31/31A BOARD


EN-31A
CCU-360P (AE)
CHROMA ON/OFF A36

AT-26 BOARD

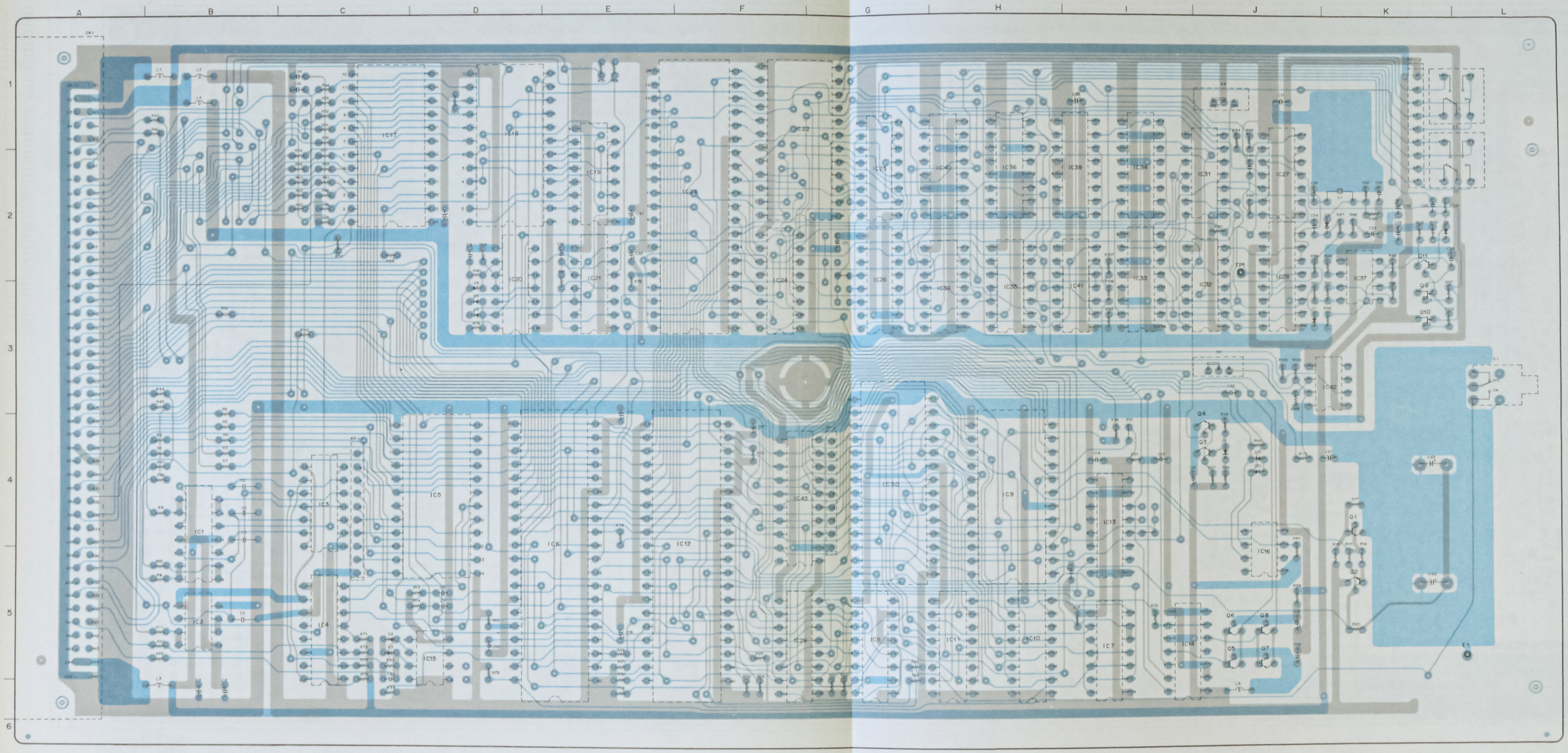

MAIN CPU
SUB CPU
CPU
I/O PORT EXPANDER
RESET PULSE GEN
REMOTE/HOST
ON REMOTE
S5 TERMINATION
TEST
RP1
D/A
CP 33K
RP5 33K
S2
S4
TP1
X1 10.944MHz
Q1 2SC2785
Q2 2SA1175
Q3, Q4 2SC2785
Q5 2SC2785 Q7 2SC2785
Q6 2SA1175 Q8 2SA1175
Q9 2SK152 Q10 2SK152 Q11 2SC2668
S TALLY IN
R TALLY IN
BUSS FREE
SD PHASE CONT B
SD PHASE CONT A
RET SEL
RET MIX
BARS CONT
CONTRAST
H PHASE CONT
SATURATION
SC PHASE CONT
PM SEL A
PM SEL B
PM SEL C
PM SEL D
WM SEL A
WM SEL B
WM SEL C
DIAG ADS A
DIAG ADS B
DIAG ADS C
CHROMA OFF
DIAG DATA(TH) IN
DIAG DATA (TX)
VD IN
CABLE LENGTH
SATURATION ON/OFF
CAM PW ON/OFF
CONTRAST ON
INT V RESET IN
EXT V RESET IN
HD IN
ALE
WR
RD
RCP DATA OUT (Y)
RCP DATA OUT (X)
PANEL DATA OUT (Y)
PANEL DATA OUT (X)
RCP DATA IN (Y)
RCP DATA IN (X)
PANEL DATA IN (Y)
PANEL DATA IN (X)
CAMERA DATA IN
CCU DATA OUT
MSU IN/OUT
→CN110-7
→CN110-6
→CN111-4/CN112-4/CN102-A4
→CN111-3/CN112-3/CN102-A3
→CN110-15
→CN110-14
→CN111-12/CN112-12/CN102-B6
→CN111-12/CN112-12/CN102-B5
→CN1-11
→CN1-13
→CN111-6/CN112-6
→CN111-7/CN112-7
+9V
+5V (A)
+5V (B)
-9V
GND

REF. NO.	TYPE	PIN NO.				
		+9V	+5V(A)	+5V(B)	GND	-9V
IC 1	TL064CN	4				11
IC 2	TL062CP	8				4
IC 3	TC4016BP		14			7
IC 4	TC4051BP		16		8	7
IC 5	μPD82C43C		24		12	
IC 6	μPD8749HD		26,40		20	
IC 7	TC40H000P		14		7	
IC 8	TC40H367P		16		8	
IC 9	TC5517APL				12	
IC 10	TC40H175P		16		8	
IC 11	TC40H175P		16		8	
IC 12	μPD8749HD		26,40		20	
IC 13	TC40163BP		16		8	
IC 14	TC4030BP		14		7	
IC 15	DIODE TLP651-VIDEO		8		5	
IC 16	DIODE TLP651-VIDEO		8		5	
IC 17	μPD82C43C			24	12	
IC 18	μPD82C43C			24	12	
IC 19	TC4040BP			16	8	
IC20	TC40H000P			14	7	
IC21	TC40H000P			14	7	
IC22	μPD82C43C			24	12	

REF. NO.	TYPE	PIN NO.				
		+9V	+5V(A)	+5V(B)	GND	-9V
IC23	μPD8749HD			26,40	20	
IC24	TC4014BP			16	8	
IC25	TC4015BP			16	8	
IC26	TC4015BP			16	8	
IC27	TC40H004P			14	7	
IC28	TC4053BP			16	8	7
IC29	TC40H367P		16		8	
IC30	MBM27C32A-25		28		14	
IC31	TC40H004P			14	7	
IC32	TC40H000P			14	7	
IC33	TC40163BP			16	8	
IC34	TC40163BP			16	8	
IC35	TC40H000P			14	7	
IC36	TC4014BP			16	8	
IC37	TL062CP	8				4
IC38	AM26LS30PC			1	5, 8	
IC39	TC4024BP			14	7	
IC40	TC4063BP			16	8	
IC41	TC40H000P			14	7	
IC42	μPC311C	8			1	
IC43	TC40H245P		20		10	

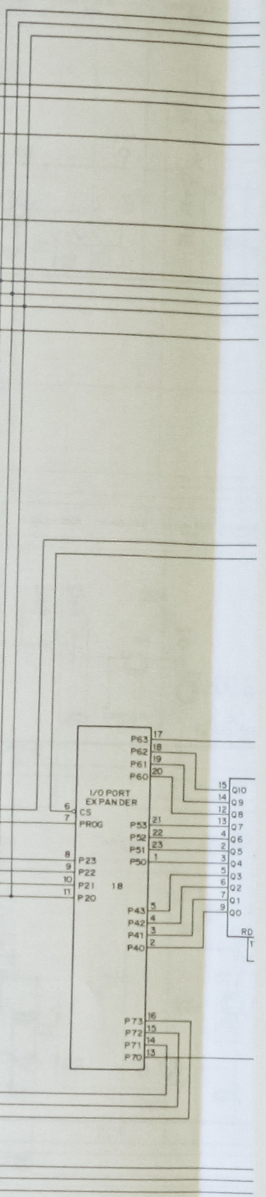
AT-26
CCU-360 (J),(UC)
CCU-360P(AE)

AT-26 BOARD
– SOLDERING SIDE –



D1	J - 4
D2	C - 5
D3	C - 5
D4	D - 3
D5	D - 3
D6	D - 3
D7	J - 3
D8	K - 2
D9	K - 2
D10	J - 4
D11	J - 4
E1	L - 5
IC1	B - 4
IC2	B - 5
IC3	C - 4
IC4	C - 5
IC5	D - 4
IC6	E - 4
IC7	I - 5
IC8	G - 5
IC9	H - 4
IC10	H - 5
IC11	H - 5
IC12	F - 4
IC13	I - 4
IC14	I - 5
IC15	D - 5
IC16	J - 5
IC17	C - 1
IC18	D - 1
IC19	E - 2
IC20	D - 2
IC21	E - 2
IC22	F - 2
IC23	F - 2
IC24	F - 2
IC25	G - 2
IC26	G - 2
IC27	J - 2
IC28	J - 2
IC29	F - 5
IC30	G - 4
IC31	J - 2
IC32	J - 2
IC33	I - 2
IC34	I - 1
IC35	H - 3
IC36	H - 2
IC37	K - 2
IC38	I - 1
IC39	H - 3
IC40	H - 2
IC41	I - 2
IC42	K - 3
IC43	F - 4
Q1	K - 4
Q2	K - 5
Q3	J - 4
Q4	J - 4
Q5	J - 5
Q6	J - 5
Q7	J - 5
Q8	J - 5
Q9	K - 3
Q10	K - 3
Q11	K - 2
S1	L - 3
S2	L - 1
S3	L - 2
S4	J - 1
S5	J - 3
TP1	J - 2
X1	K - 2

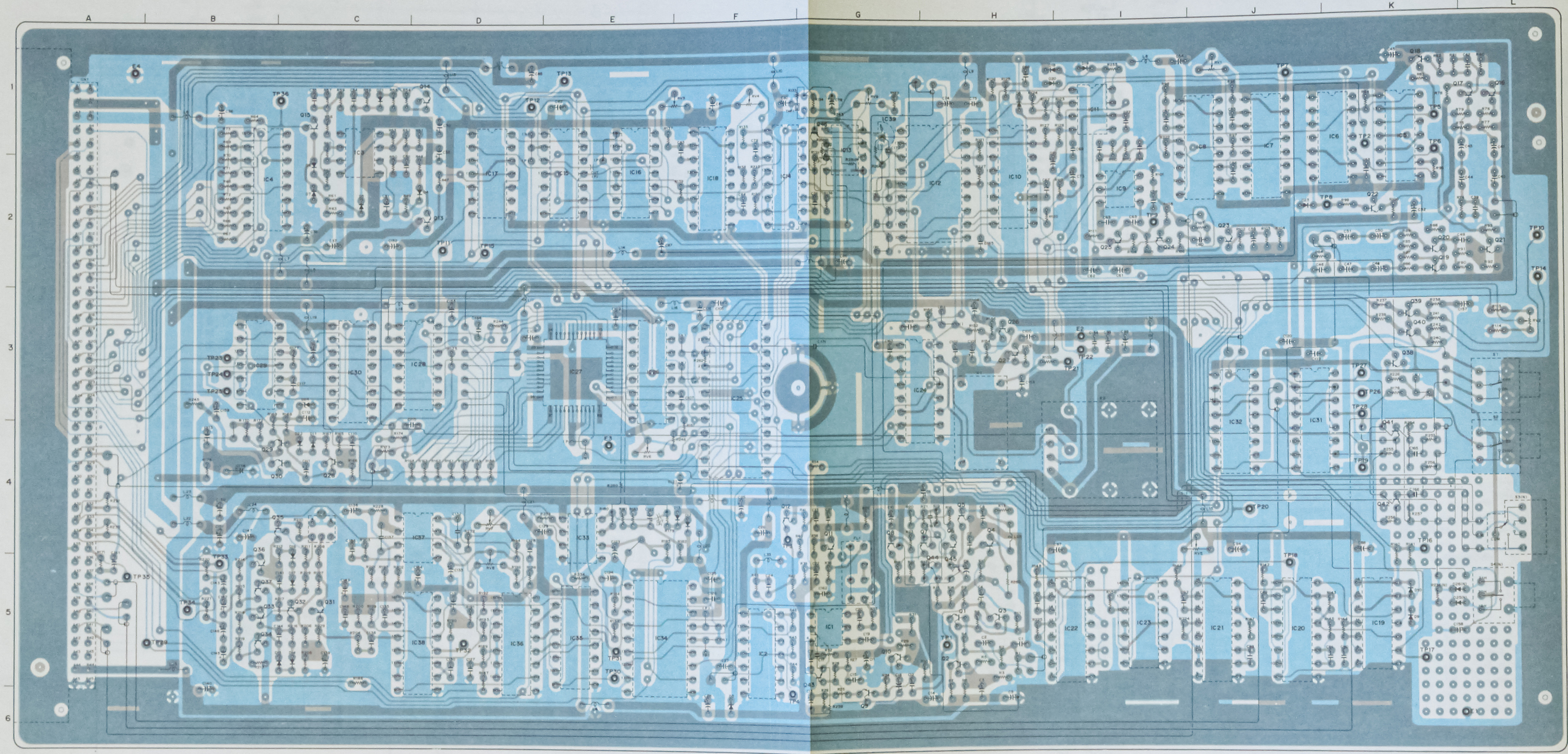
AT-26 BOARD
– SOLDERING SIDE –
1-615-207-11
CCU-360 (UC, J)
CCU-360P(AE)


I/O PORT
EXPANDER
CS
PROG
P63
P62
P61
P60
P53
P52
P51
P50
P23
P22
P21
P20
P43
P42
P41
P40
P73
P72
P71
P70
Q10
Q9
Q8
Q7
Q6
Q5
Q4
Q3
Q2
Q1
Q0
RD

GND	-9V
	11
	4
	7
8	7
12	
20	
7	
8	
12	
8	
8	
20	
8	
7	
5	
5	
12	
12	
8	
7	
7	
12	

REF. NO.	TYPE
IC23	µPD8749HD
IC24	TC4014BP
IC25	TC4015BP
IC26	TC4015BP
IC27	TC40H004P
IC28	TC4053BP
IC29	TC40H367P
IC30	MBM27C32A-25
IC31	TC40H004P
IC32	TC40H000P
IC33	TC40163BP
IC34	TC40163BP
IC35	TC40H000P
IC36	TC4014BP
IC37	TL062CP
IC38	AM26LS30PC
IC39	TC4024BP
IC40	TC4063BP
IC41	TC40H000P
IC42	µPC311C
IC43	TC40H245P

SG-9/9P BOARD
– SOLDERING SIDE –

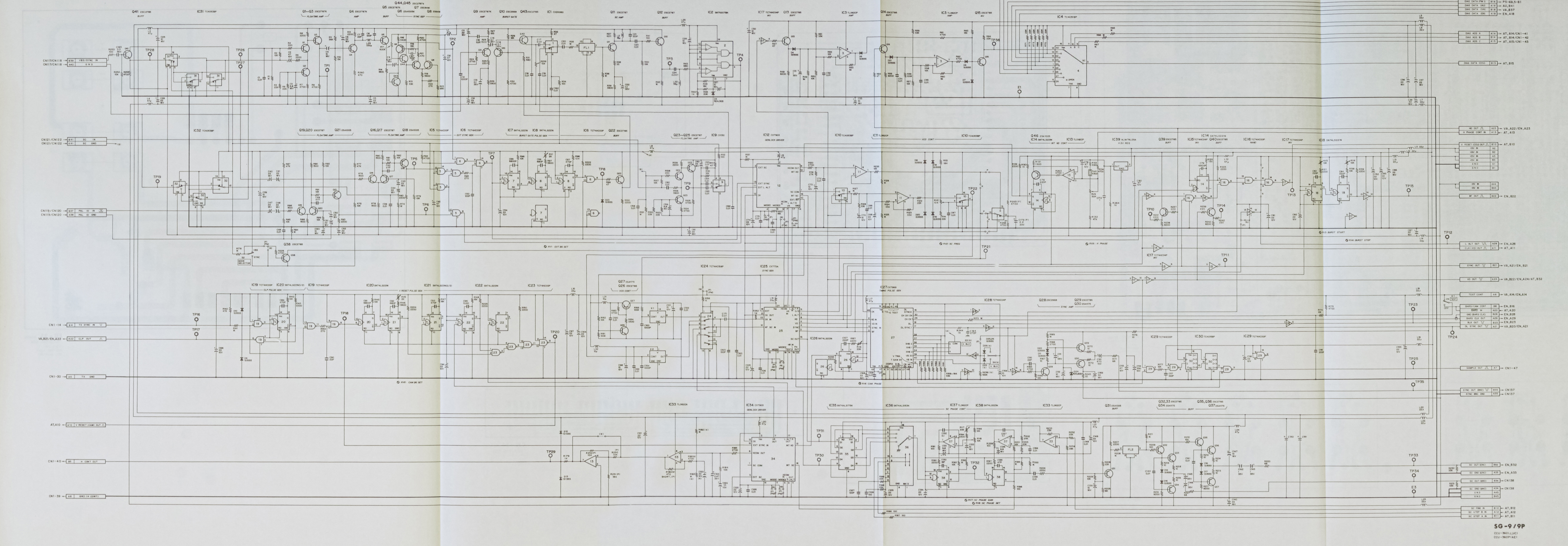

A
B
C
D
E
F
G
H
I
J
K
L
1
2
3
4
5
6
IC1
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC12
IC14
IC16
IC17
IC18
IC19
IC20
IC21
IC22
IC23
IC24
IC27
IC28
IC30
IC31
IC32
IC33
IC34
IC35
IC36
IC37
IC38
IC39
TP1
TP2
TP5
TP6
TP7
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP20
TP21
TP22
TP23
TP24
TP25
TP26
TP27
TP28
TP29
TP30
TP31
TP32
TP33
TP34
TP35
TP36
E4

CN1	A-1
D1	H-5
D2	H-5
D3	F-6
D4	D-2
D5	C-2
D6	C-2
D7	C-2
D8	H-1
D9	K-5
D10	K-5
D11	C-4
D12	F-4
D13	F-4
D14	C-5
D15	B-5
D16	C-5
D17	C-5
D18	H-1
D19	I-1
D20	H-1
D21	C-1
D22	C-4
D23	J-2
D24	C-3
D25	K-5
D26	K-5
D27	D-3
E1	L-6
E2	I-3
E3	E-4
E4	A-1
FL1	G-4
FL2	C-4
IC1	G-5
IC2	F-5
IC3	C-1
IC4	B-2
IC5	K-1
IC6	K-1
IC7	J-1
IC8	J-1
IC9	I-2
IC10	H-2
IC11	I-1
IC12	H-2
IC13	G-1
IC14	F-2
IC15	E-2
IC16	E-2
IC17	D-2
IC18	F-2
IC19	K-5
IC20	J-5
IC21	J-5
IC22	I-5
IC23	I-5
IC24	G-3
IC25	F-3
IC26	E-3
IC27	E-3
IC28	D-3
IC29	B-3
IC30	C-3
IC31	J-3
IC32	J-3
IC33	E-4
IC34	E-5
IC35	E-5
IC36	D-5
IC37	D-4
IC38	D-5
IC39	G-1
Q1	H-5
Q2	H-5
Q3	H-5
Q4	H-4
Q5	H-4
Q6	H-4
Q7	G-4
Q8	G-4
Q9	G-5
Q10	G-5
Q11	G-4
Q12	F-4
Q13	D-2
Q14	D-1
Q15	C-1
Q16	L-1
Q17	L-1
Q18	K-1
Q19	K-2
Q20	K-2
Q21	L-2
Q22	K-2
Q23	J-2
Q24	I-2
Q25	I-2
Q26	H-3
Q27	H-3
Q28	C-4
Q29	B-4
Q30	B-4
Q31	C-5
Q32	C-5
Q33	B-5
Q34	B-5
Q35	B-4
Q36	B-5
Q37	B-5
Q38	K-3
Q39	K-3
Q40	K-3
Q41	K-4
Q42	K-4

RV1	J-1
RV2	L-3
RV3	E-1
RV4	F-1
RV5	J-4
RV6	E-4
RV7	D-4
RV8	D-5
RV9	G-1
RV10	H-5
RV11	E-4
S1	L-3
S2	L-4
S3	L-4
S4	L-5
TP1	H-5
TP2	K-1
TP3	F-4
TP4	F-3
TP5	K-1
TP6	K-1
TP7	J-1
TP8	K-2
TP9	I-2
TP10	L-2
TP11	D-2
TP12	D-1
TP13	E-1
TP14	L-2
TP15	D-2
TP16	K-4
TP17	K-5
TP18	J-5
TP19	K-4
TP20	J-4
TP21	I-3
TP22	I-3
TP23	B-3
TP24	B-3
TP25	B-3
TP26	K-3
TP27	A-5
TP27	K-3
TP28	C-1
TP28	K-3
TP29	E-5
TP30	E-5
TP31	E-5
TP33	E-5
TP32	D-5
TP34	B-5
TP35	A-5
TP36	C-1
X1	H-3
X2	I-3

SG-9/9P BOARD
-SOLDERING SIDE-
1-615-208-11
CCU-360(UC,J)
CCU-360P(AE)

SG-9/9P BOARD

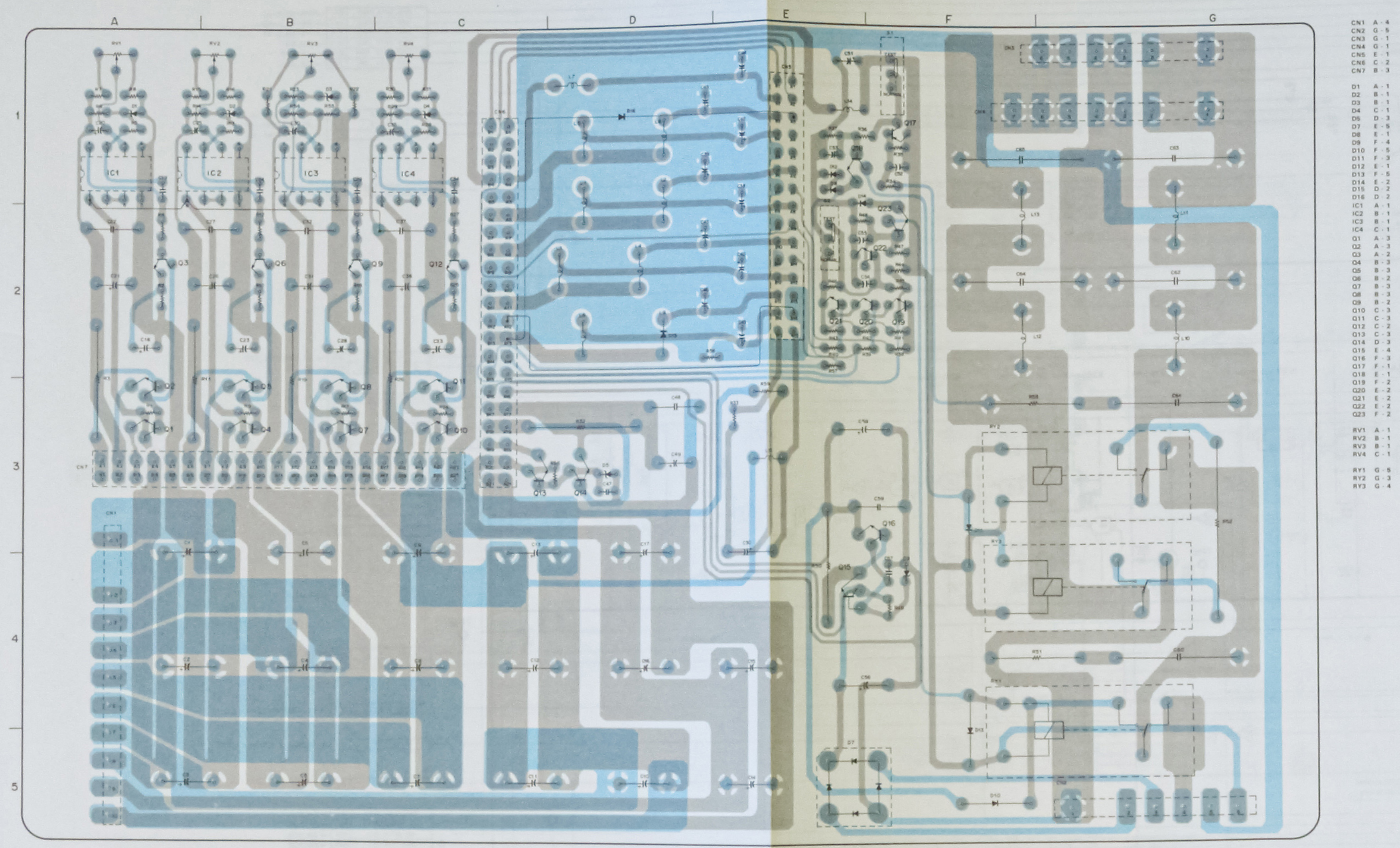

SC GND (BNC)
A34
CN138
GND
A45
GND
B45
SC FINE IN
B12
AT, B12
SC STEP B IN
A12
AT, A12
SC STEP A IN
B11
AT, B11

SG-9/9P

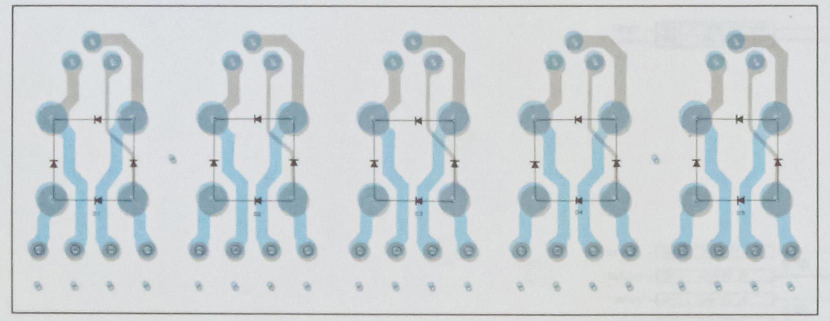
CCU-360(J,UC)
CCU-360P(AE)

POWER SUPPLY

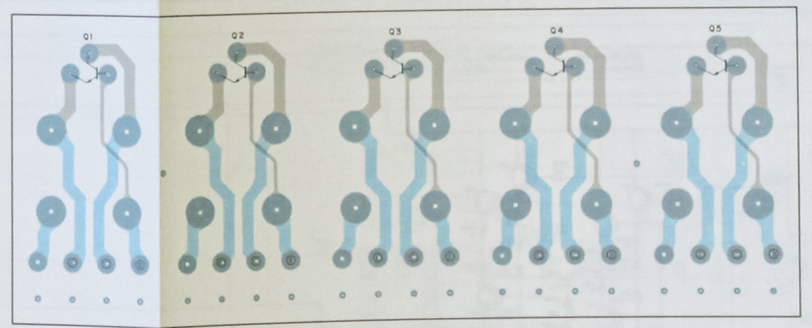
CN-13, 14 BOARD
FU-25 BOARD
LE-29 BOARD
PS-69, 70 BOARD
RE-18(A), 18(B) BOARD
– SOLDERING SIDE –



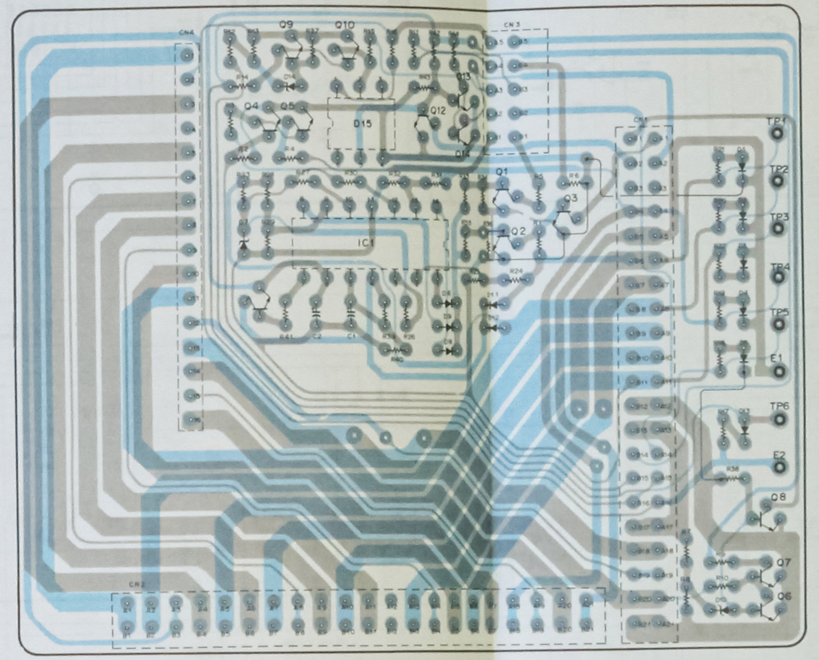
PS-69 BOARD
-SOLDERING SIDE-
1-615-211-11
CCU-360(J,UC)
CCU-360P(AE)



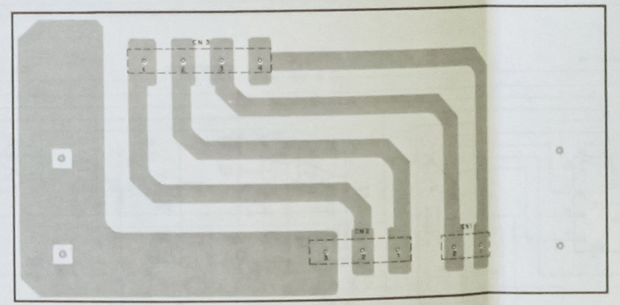
RE-18(A) BOARD
—SOLDERING SIDE—
1-615-201-11
CCU-360
CCU-360P



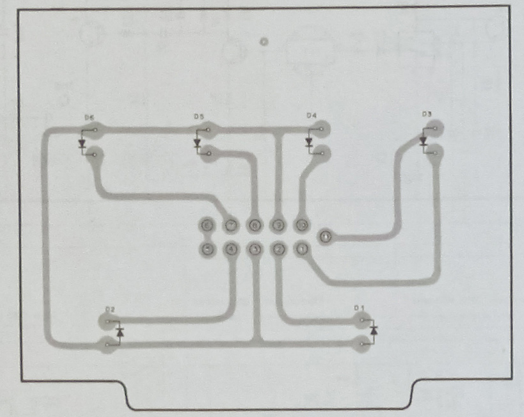
RE-18(B) BOARD
—SOLDERING SIDE—
1-615-201-11
CCU-360
CCU-360P



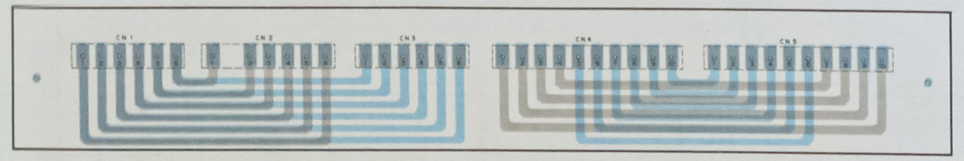
PS-70 BOARD
— SOLDERING SIDE—
1-615-212-11
CCU-360(J,UC)
CCU-360P (AE)



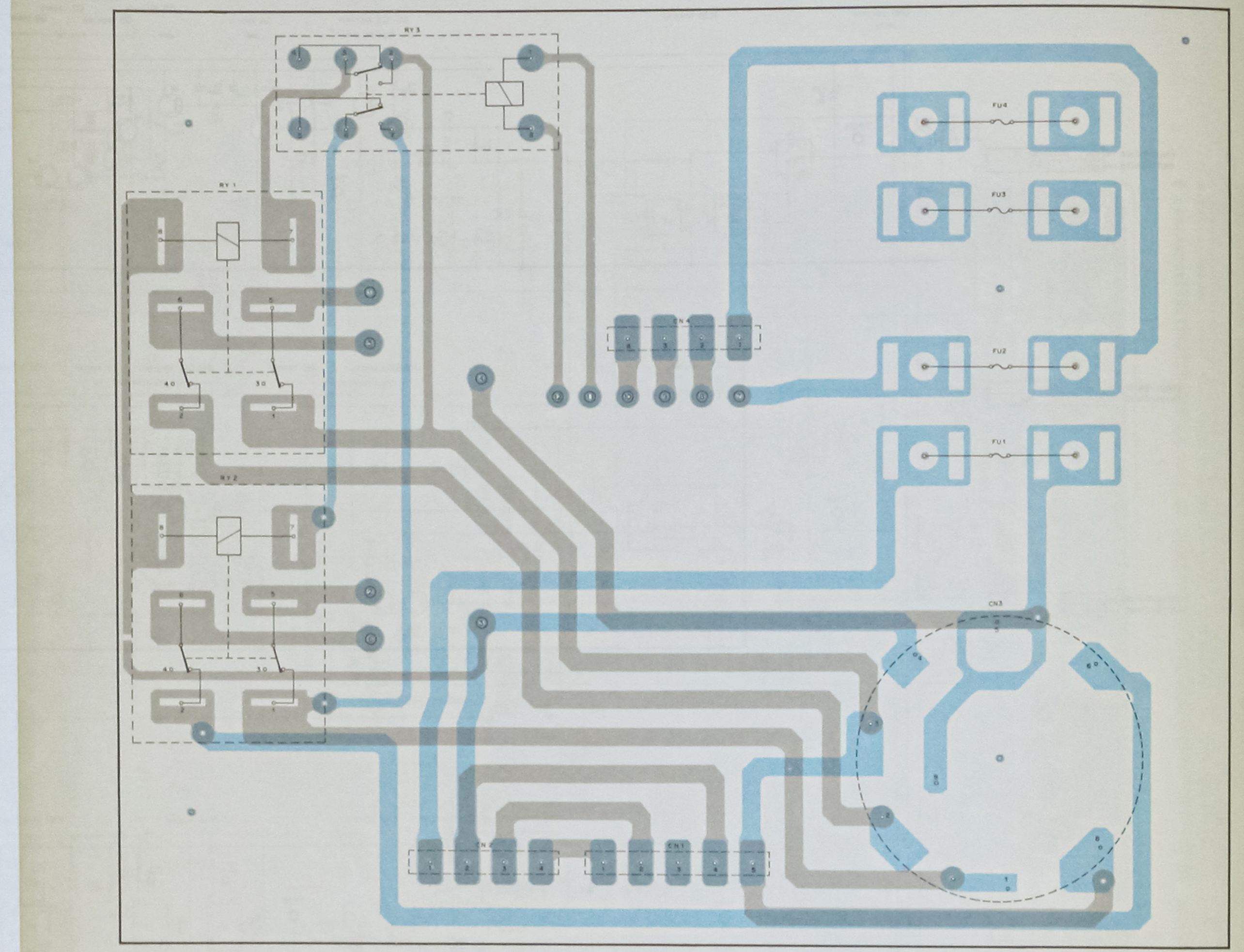
CN-13 BOARD
-SOLDERING SIDE-
1-615-213-11
CCU-360
CCU-360P



LE-29 BOARD
-SOLDERING SIDE-
1-615-200-11
CCU-360
CCU-360P

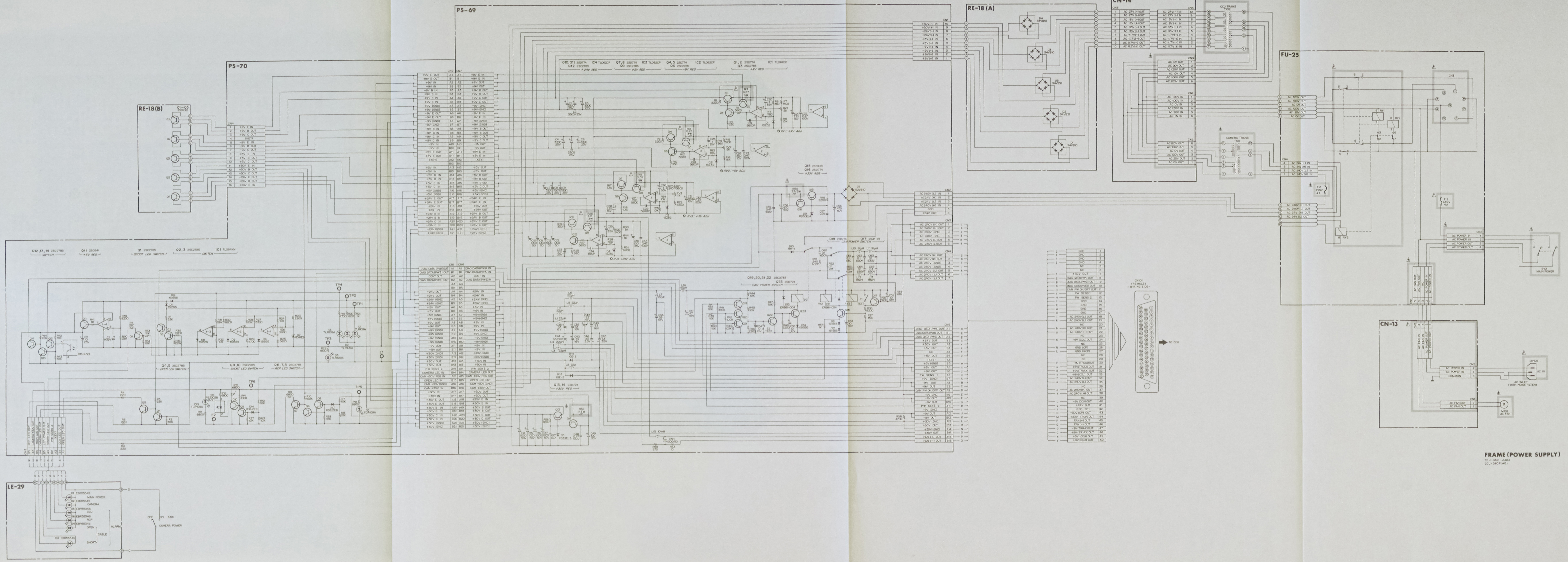


CN-14 BOARD
-SOLDERING SIDE-
1-615-214-11
CCU-360
CCU-360P



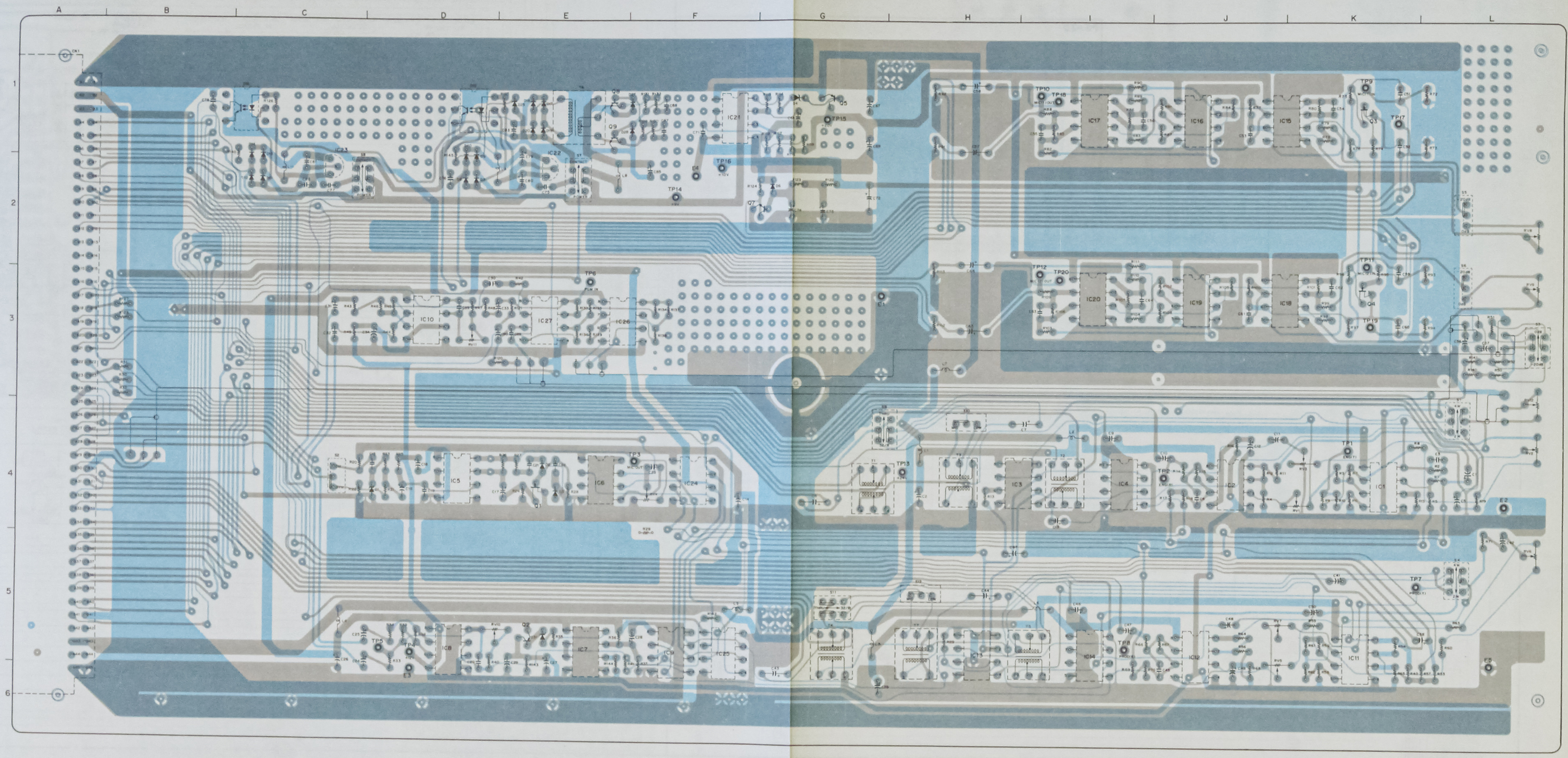
FU-25 BOARD
-SOLDERING SIDE-
1-615-215-11
CCU-360(J,UC)
CCU-360P(AE)

POWER SUPPLY


PS-69
PS-70
RE-18 (B)
RE-18 (A)
CN-14
FU-25
CN-13
LE-29
TO CCU

FRAME (POWER SUPPLY)
CCU-360 (J,UC)
CCU-360P(AE)

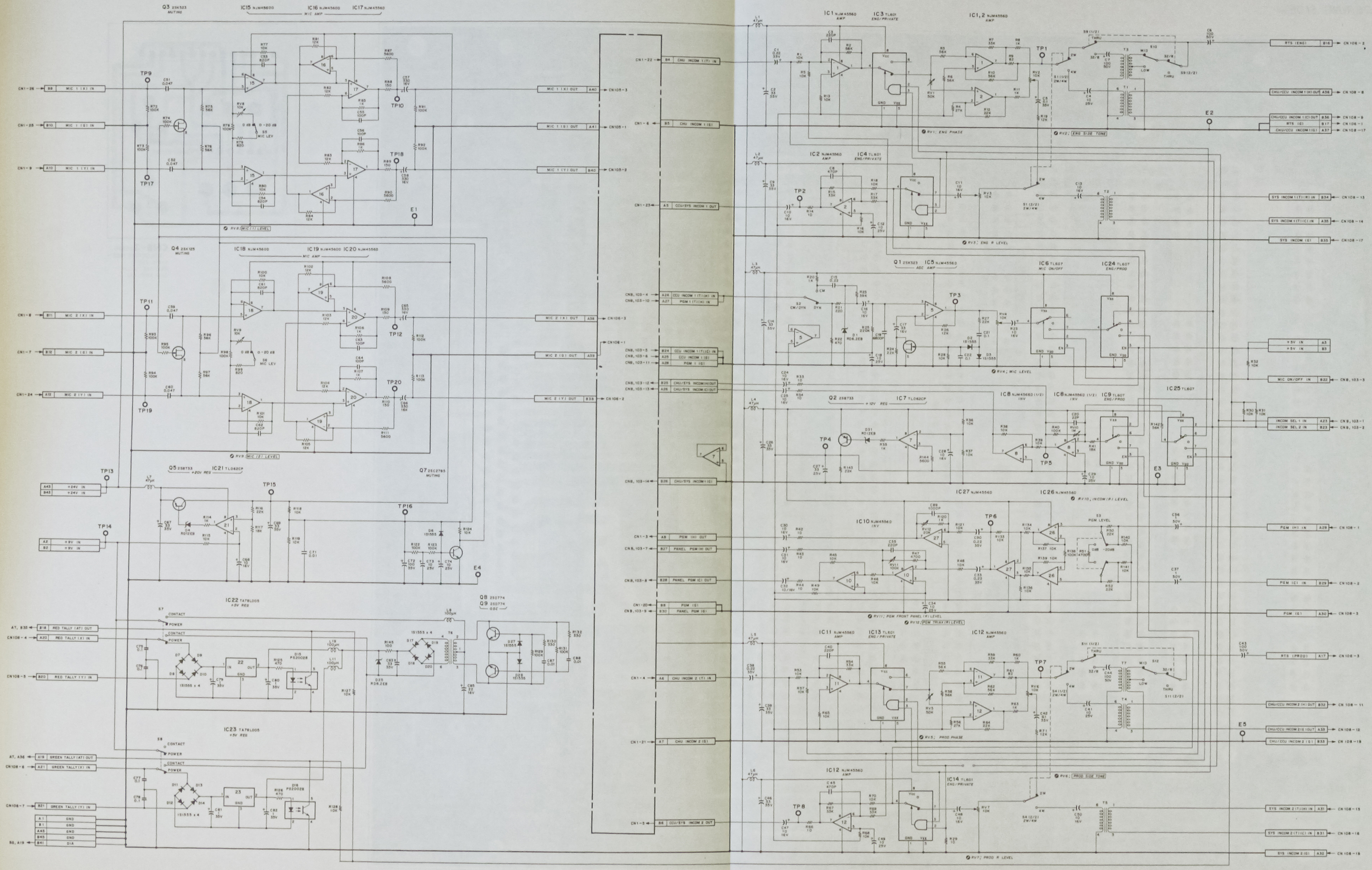
AU-58 BOARD
– SOLDERING SIDE –



AU-58 BOARD
-SOLDERING SIDE-
1-615-206-13
CCU-360(UC,J)
CCU-360P(AE)

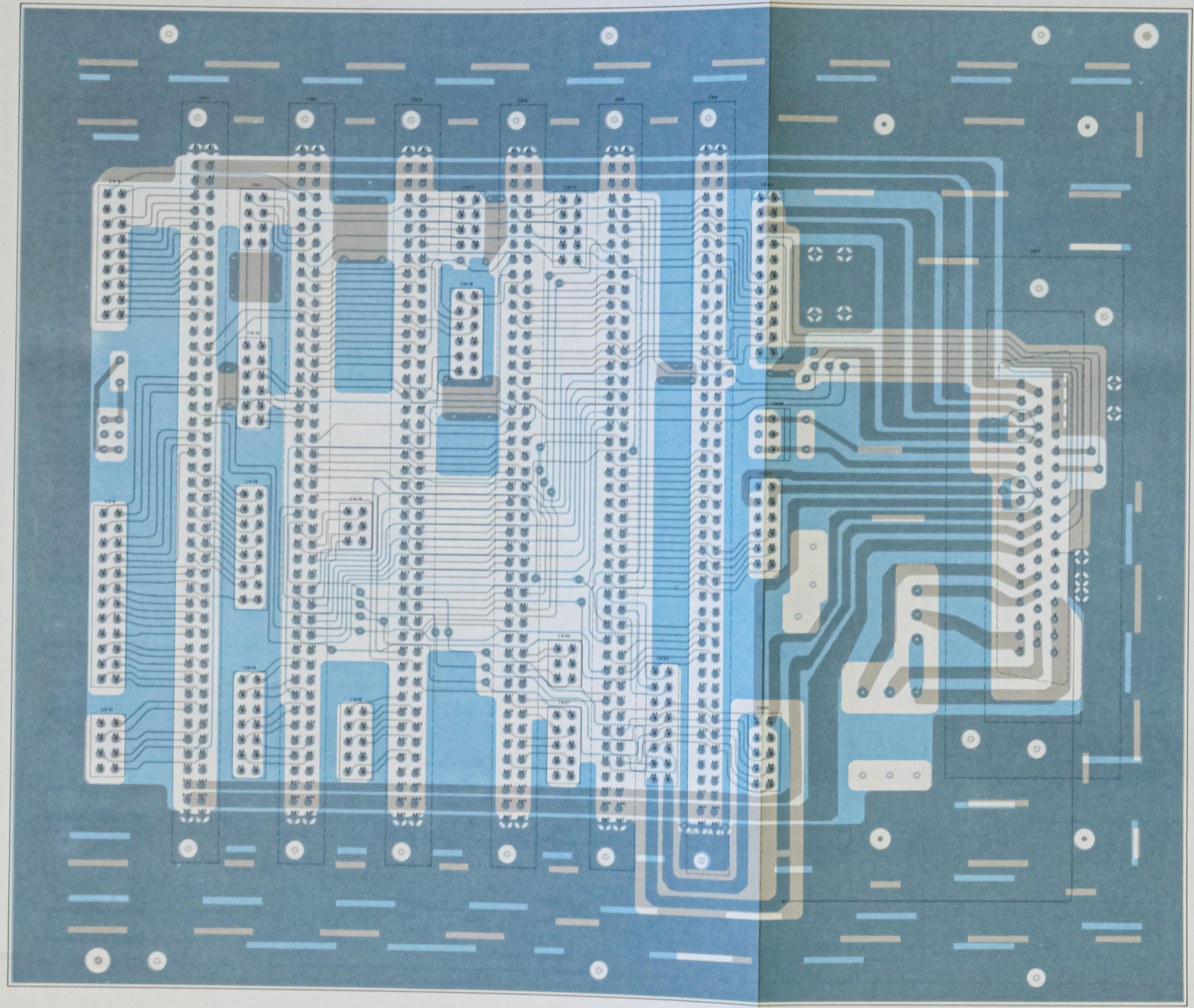
D1	D-4
D2	E-4
D3	E-4
D4	G-1
D5	G-1
D6	G-2
D7	D-2
D8	D-2
D9	D-2
D10	D-2
D11	C-2
D12	C-2
D13	C-1
D14	C-1
D15	D-1
D16	C-1
D17	E-1
D18	E-1
D19	E-1
D20	E-1
D21	C-1
D22	C-1
D23	C-1
D24	C-1
D26	C-1
D29	D-1
D30	D-1
D31	E-5
E1	G-3
E2	L-4
E3	D-6
E4	F-2
E5	L-5
IC1	K-4
IC2	J-4
IC3	H-4
IC4	I-4
IC5	D-4
IC6	E-4
IC7	E-5
IC8	D-5
IC9	F-5
IC10	D-3
IC11	K-5
IC12	E-1
IC12	J-5
IC13	H-5
IC14	I-5
IC15	K-1
IC16	J-1
IC17	I-1
IC18	K-2
IC19	J-3
IC20	I-3
IC21	F-1
IC22	E-2
IC23	C-2
IC26	E-3
IC27	E-3
Q1	E-4
Q2	E-5
Q3	K-1
Q4	K-2
Q5	G-1
Q6	G-1
Q7	G-2
Q8	E-1
Q9	E-1
Q10	D-1
Q11	D-1
RV1	K-4
RV2	L-4
RV3	K-4
RV4	F-4
RV5	J-5
RV6	L-5
RV7	L-5
RV8	L-2
RV9	L-3
RV10	D-5
RV11	D-3
RV12	L-3
S1	L-4
S2	C-4
S3	E-3
S4	L-5
S5	L-2
S6	L-3
S7	E-2
S8	C-2
S9	G-4
S10	H-4
S11	G-5
S12	H-5
TP1	K-4
TP2	J-4
TP3	F-4
TP4	D-5
TP5	D-5
TP6	E-3
TP7	L-5
TP8	I-5
TP9	K-1
TP10	I-1
TP11	K-2
TP12	I-3
TP13	H-4
TP14	F-2
TP15	G-1
TP16	F-2
TP17	K-1
TP18	I-1
TP19	K-3
TP20	I-3

AU-58 BOARD

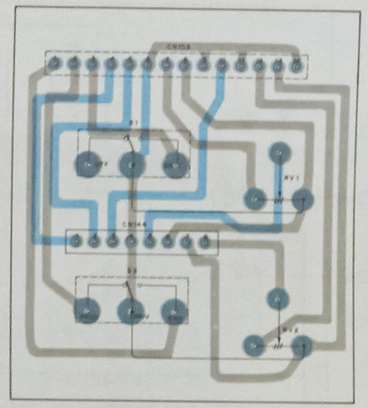

Q3 2SK523 MUTING
IC15 NJM4560
IC16 NJM4560 MIC AMP
IC17 NJM4560
TP9
TP10
TP17
TP18
E1
MIC 1 (X) IN
MIC 1 (G) IN
MIC 1 (Y) IN
MIC 1 (X) OUT
MIC 1 (G) OUT
MIC 1 (Y) OUT
RV8 MIC (1) LEVEL
Q4 2SK125 MUTING
IC18 NJM4560
IC19 NJM4560
IC20 NJM4560 MIC AMP
TP11
TP12
TP19
TP20
MIC 2 (X) IN
MIC 2 (G) IN
MIC 2 (Y) IN
MIC 2 (X) OUT
MIC 2 (G) OUT
MIC 2 (Y) OUT
RV9 MIC (2) LEVEL
TP13
TP14
TP15
TP16
Q5 2SB733
IC21 TL062CP
Q7 2SC2785 MUTING
+24V IN
+5V IN
E4
IC22 TA78L005 +5V REG
Q8 2SD774
Q9 2SD774 OSC
RED TALLY (AT) OUT
RED TALLY (X) IN
RED TALLY (Y) IN
IC23 TA78L005 +5V REG
GREEN TALLY (AT) OUT
GREEN TALLY (X) IN
GREEN TALLY (Y) IN
GND
CONTACT
POWER
IC1 NJM4560 AMP
IC3 TL601 ENG/PRIVATE
IC1, 2 NJM4560 AMP
TP1
RV1 ENG PHASE
RV2 ENG SIDE TONE
CHU INCOM 1 (T) IN
CHU INCOM 1 (G)
RTS (ENG)
CHU/CCU INCOM 1 (X) OUT
CHU/CCU INCOM 1 (G) OUT
RTS (G)
CHU/CCU INCOM 1 (G)
E2
IC2 NJM4560 AMP
IC4 TL601 ENG/PRIVATE
TP2
RV3 ENG P LEVEL
CCU/SYS INCOM 1 OUT
SYS INCOM 1 (T) (X) IN
SYS INCOM 1 (T) (G) IN
SYS INCOM (G)
Q1 2SK523
IC5 NJM4560 ADC AMP
IC6 TL601 MIC ON/OFF
IC24 TL601 ENG/PROD
TP3
RV4 MIC LEVEL
CCU INCOM 1 (T) (X) IN
PGM 1 (T) (X) IN
+5V IN
MIC ON/OFF IN
Q2 2SB733
IC7 TL062CP +12V REG
IC8 NJM4560 (1/2)
IC8 NJM4560 (1/2)
IC9 TL601 ENG/PROD
IC25 TL601
TP4
TP5
E3
INCOM SEL 1 IN
INCOM SEL 2 IN
CHU/SYS INCOM (G)
IC27 NJM4560
IC26 NJM4560
IC10 NJM4560
RV10 INCOM (P) LEVEL
TP6
PGM LEVEL
PGM (X) OUT
PANEL PGM (X) OUT
PANEL PGM (G) OUT
PGM (G)
PANEL PGM (G)
PGM (X) IN
PGM (G) IN
RV11 PGM FRONT PANEL (F) LEVEL
RV12 PGM TRIAX (R) LEVEL
IC11 NJM4560 AMP
IC13 TL601 ENG/PRIVATE
IC12 NJM4560 AMP
TP7
RV5 PROD PHASE
RV6 PROD SIDE TONE
CHU INCOM 2 (T) IN
CHU INCOM 2 (G)
RTS (PROD)
CHU/CCU INCOM 2 (X) OUT
CHU/CCU INCOM 2 (G) OUT
CHU/CCU INCOM 2 (G)
E5
IC12 NJM4560 AMP
IC14 TL601 ENG/PRIVATE
TP8
RV7 PROD P LEVEL
CCU/SYS INCOM 2 OUT
SYS INCOM 2 (T) (X) IN
SYS INCOM 2 (T) (G) IN
SYS INCOM 2 (G)
CN106-15
CN106-16
CN106-19

AU-58
CCU-360 (J,UC)
CCU-360P(AE)

MB-91 BOARD
CNB-3 BOARD
– SOLDERING SIDE –

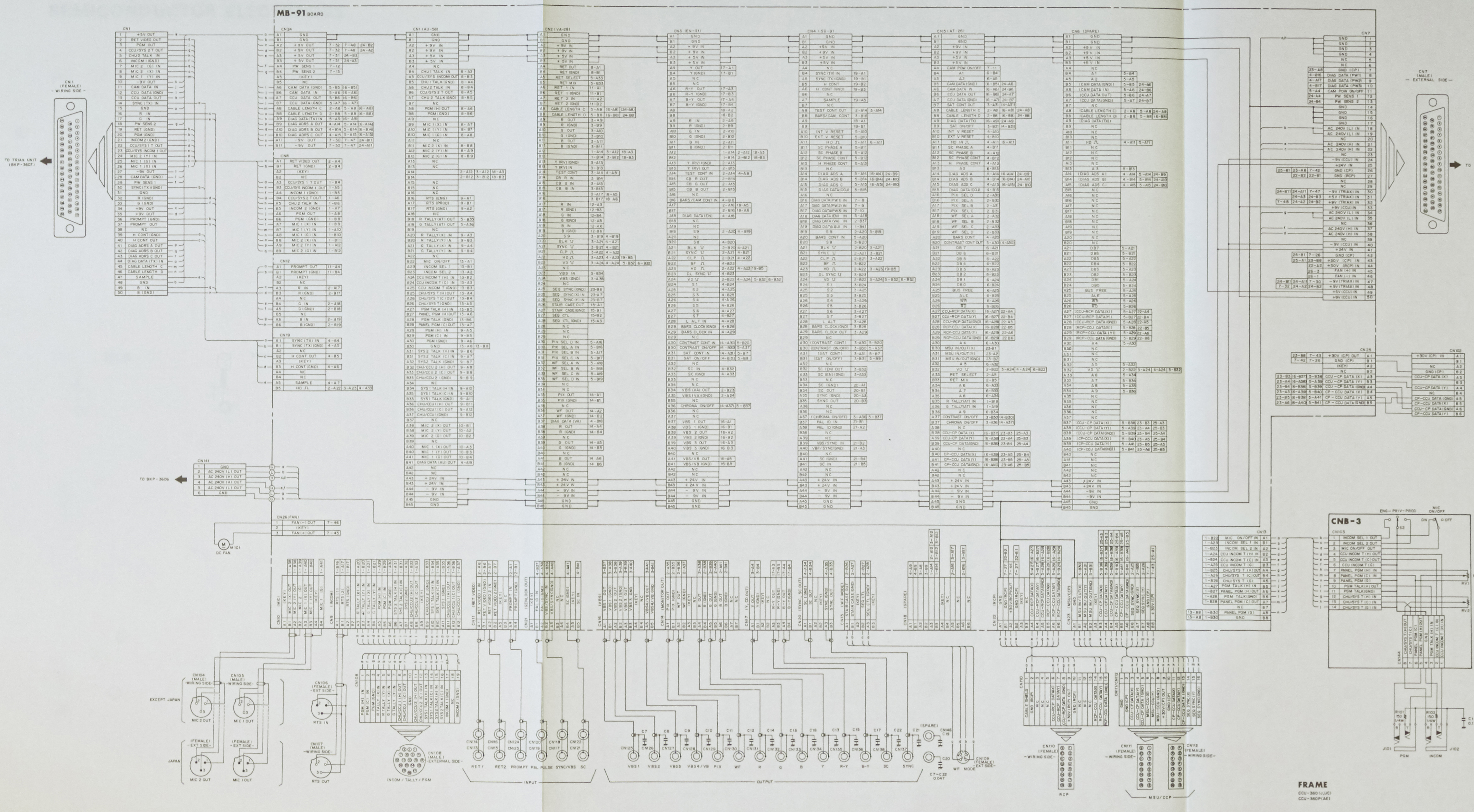


MB-91 BOARD
–SOLDERING SIDE–
1-615-202-11
CCU-360(J,UC)
CCU-360P(AE)



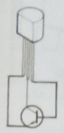
CNB-3 BOARD
–SOLDERING SIDE–
1-615-210-11
CCU-360 (UC,J)
CCU-360P(AE)

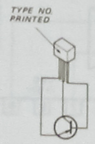
FRAME


MB-91 BOARD
CN1 (FEMALE) - WIRING SIDE -
TO TRIAX UNIT (BKP-3607)
CN24
CN1 (AU-58)
CN2 (VA-29)
CN3 (EN-51)
CN4 (SE-9)
CN5 (AT-26)
CN6 (SPARE)
CN7
CN7 (MALE) - EXTERNAL SIDE -
TO POWER UNIT
CN8
CN12
CN19
CN141
TO BKP-3606
CN26 (FAN)
M101 DC FAN
CN25
CN102
TO BKP-3601 CONTROL PANEL
CNB-3
ENG - PRIV - PROD
MIC ON/OFF
PGM
INCOM
CN104 (MALE) - WIRING SIDE -
CN105 (MALE) - WIRING SIDE -
EXCEPT JAPAN
JAPAN
MIC 2 OUT
MIC 1 OUT
CN106 (FEMALE) - EXT SIDE -
CN107 (MALE) - WIRING SIDE -
RTS IN
RTS OUT
CN108 (MALE) - EXTERNAL SIDE -
INCOM / TALLY / PGM
RET 1
RET 2
PROMPT
PAL PULSE
SYNC/VBS
SC
INPUT
VBS 1
VBS 2
VBS 3
VBS 4 / VB
PIX
WF
R
G
B
Y
R-Y
B-Y
SC
SYNC
OUTPUT
(SPARE)
WF MODE
CN109 (FEMALE) - EXT SIDE -
C7 ~ C22 0.047
CN110 (FEMALE) - WIRING SIDE -
RCP
CN111 (FEMALE) - WIRING SIDE -
CN112 (FEMALE) - WIRING SIDE -
MSU / CCP
J101
J102
PGM
INCOM

FRAME
CCU-360(J,UC)
CCU-360P(AE)

SECTION 7
SEMICONDUCTOR ELECTRODES


2SA1005


TYPE NO. PRINTED
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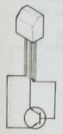
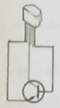
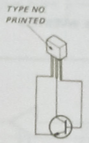
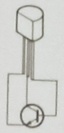
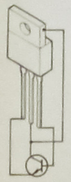
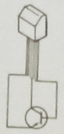

2SB733

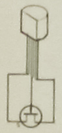

2SC2668
2SC2669

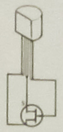

TYPE NO. PRINTED
2SC2785
2SC2787

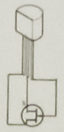

2SC641K


2SD1061

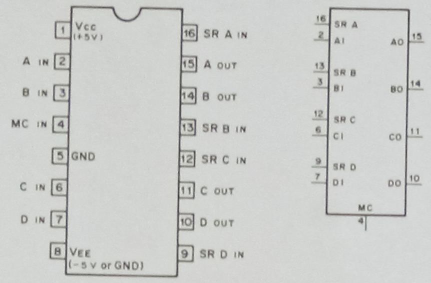

2SD774


2SK125

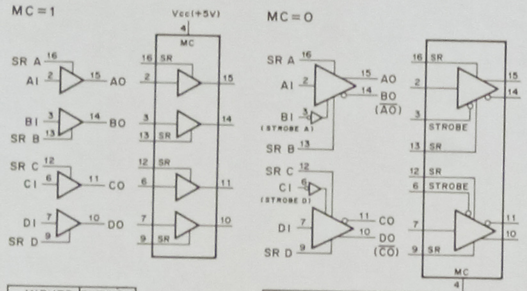

2SK152


2SK523

AM26LS30PC (ADVANCED MICRO DEVICES)
LINE DRIVER
— TOP VIEW —


Vcc (+5V)
A IN
B IN
MC IN
GND
C IN
D IN
VEE (−5 V or GND)
SR A IN
A OUT
B OUT
SR B IN
SR C IN
C OUT
D OUT
SR D IN
SR A
AI
AO
SR B
BI
BO
SR C
CI
CO
SR D
DI
DO
MC

MC ; MODE CONTROL
SR ; SLEW RATE CONTROL

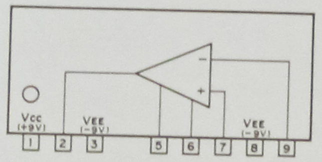

MC = 1
Vcc(+5V)
SR A
AI
AO
BI
SR B
BO
SR C
CI
CO
DI
SR D
DO
MC
SR
MC = 0
AO
BO
(AO)
(STROBE A)
(STROBE D)
CO
DO
(CO)
STROBE

INPUTS		OUTPUTS
MC	A TO D	A TO D
1	0	0
1	1	1

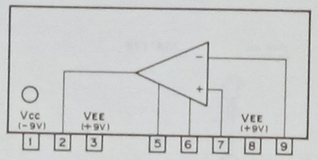
INPUTS			OUTPUTS	
MC	STROBE	A & D	A & D	B & C
0	0	0	0	1
0	0	1	1	0
0	1	X	HI-Z	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X;DON'T CARE
HI-Z;HIGH IMPEDANCE

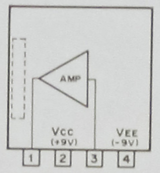
BX1304 (SONY)
VIDEO AMPLIFIER
— PRINTED SIDE —


Vcc (+9V)
VEE (−9V)
VEE (−9V)
1
2
3
5
6
7
8
9

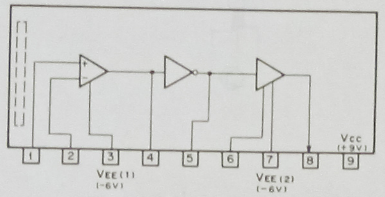
BX1305 (SONY)
VIDEO AMPLIFIER
— PRINTED SIDE —


Vcc (−9V)
VEE (+9V)
VEE (+9V)
1
2
3
5
6
7
8
9

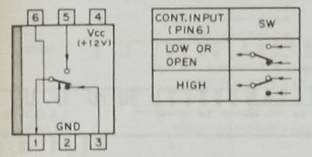
BX1319 (SONY)
HYBRID VIDEO AMPLIFIER
— REAR VIEW —


AMP
Vcc (+9V)
VEE (−9V)
1
2
3
4

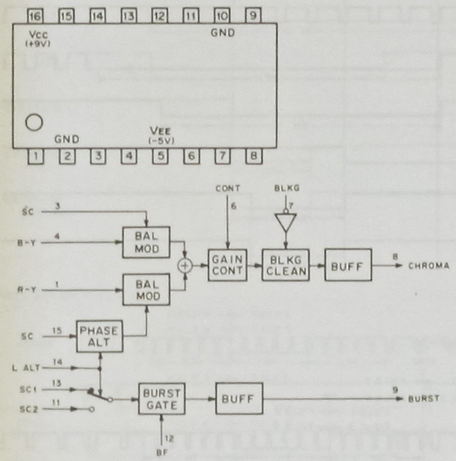
BX315 (SONY)
VIDEO OUTPUT AMPLIFIER (PHASE INVERTED)
— REAR VIEW —


Vcc (+9V)
VEE (1) (−6V)
VEE (2) (−6V)
1
2
3
4
5
6
7
8
9

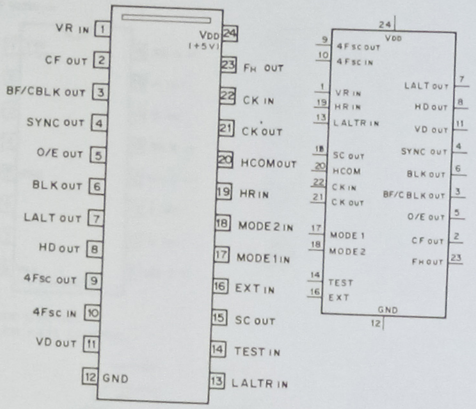
CX130 (SONY)
ANALOG SWITCH
— TOP VIEW —


6
5
4
Vcc (+12V)
GND
1
2
3
CONT.INPUT (PIN6)
SW
LOW OR OPEN
HIGH

CX22017 (SONY)
VIDEO SIGNAL PROCESSOR
— TOP VIEW —


Vcc (+9V)
GND
GND
VEE (−5V)
SC
B-Y
R-Y
SC
L ALT
SC1
SC2
BAL MOD
BAL MOD
PHASE ALT
CONT
BLKG
GAIN CONT
BLKG CLEAN
BUFF
CHROMA
BURST GATE
BUFF
BURST
BF

CX773A (SONY)
C-MOS SYNC GENERATOR (NTSC, PAL-M, PAL, SECAM)
— TOP VIEW —


VR IN 1
CF OUT 2
BF/CBLK OUT 3
SYNC OUT 4
O/E OUT 5
BLK OUT 6
LALT OUT 7
HD OUT 8
4Fsc OUT 9
4Fsc IN 10
VD OUT 11
12 GND
24 VDD (+5V)
23 FH OUT
22 CK IN
21 CK OUT
20 HCOM OUT
19 HR IN
18 MODE 2 IN
17 MODE 1 IN
16 EXT IN
15 SC OUT
14 TEST IN
13 LALTR IN
VDD
GND

O/E : ODD/EVEN FIELD
CF : COLOR FRAME PULSE
HCOM : H COMPARATOR

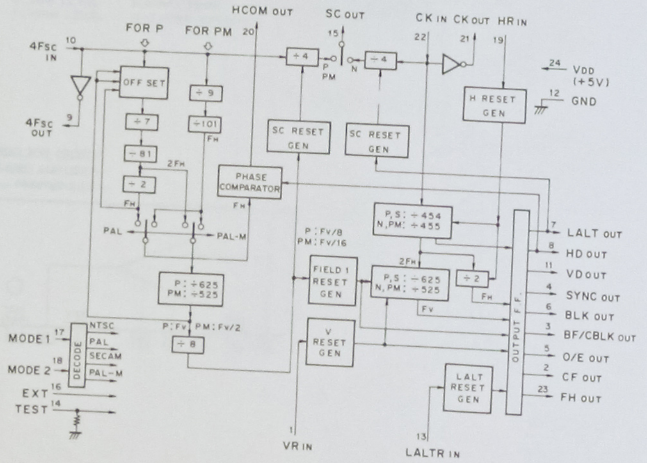
SYSTEM	4Fsc	CLOCK
NTSC	910 FH	910 FH
PAL	1135 FH+2Fv	908 FH
PALM	909 FH	910 FH
SECAM	——	908 FH

INPUTS		SYSTEM
MODE 1	MODE 2	
0	0	NTSC
0	1	SECAM
1	0	PALM
1	1	PAL

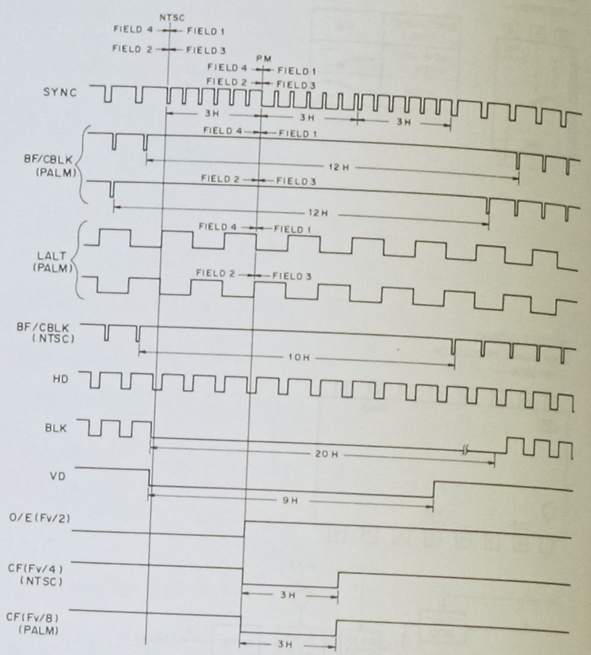
0 ; LOW LEVEL (GND)
1 ; HIGH LEVEL (VDD)

INPUTS		FUNCTION
EXT	TEST	
0	0	INTERNAL
0	1	INVALID
1	0	EXT
1	1	TEST

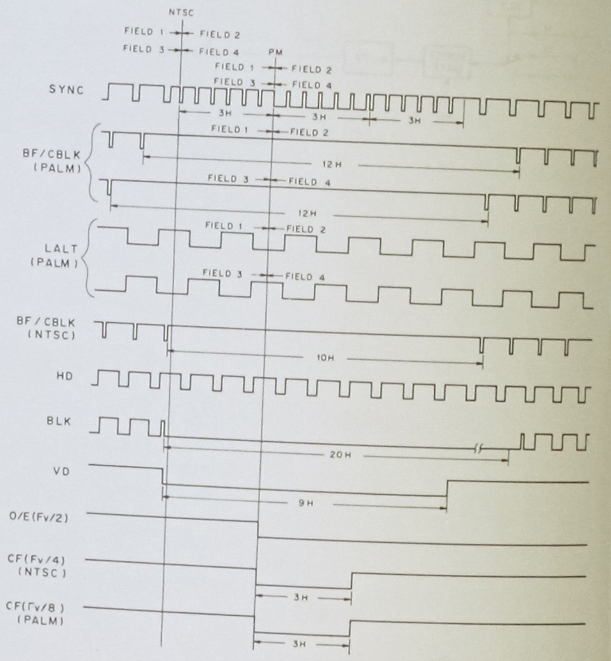
TEST "0" : OPEN (INTERNALLY PULLED DOWN)

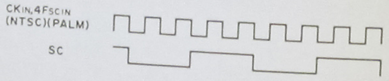

4Fsc IN
4Fsc OUT
FOR P
FOR PM
HCOM OUT
SC OUT
CK IN
CK OUT
HR IN
VDD (+5V)
GND
OFF SET
÷9
÷7
÷101
÷81
÷2
2FH
FH
÷4
SC RESET GEN
PHASE COMPARATOR
H RESET GEN
P;FV/8
PM;FV/16
FIELD 1 RESET GEN
P,S; ÷454
N,PM; ÷455
P,S; ÷625
N,PM; ÷525
P; ÷625
PM; ÷525
V RESET GEN
LALT RESET GEN
OUTPUT F/F
PAL
PAL-M
NTSC
SECAM
DECODE
MODE 1
MODE 2
EXT
TEST
VR IN
LALTR IN
LALT OUT
HD OUT
VD OUT
SYNC OUT
BLK OUT
BF/CBLK OUT
O/E OUT
CF OUT
FH OUT

NTSC, PAL-M (FIELD 1, 3)

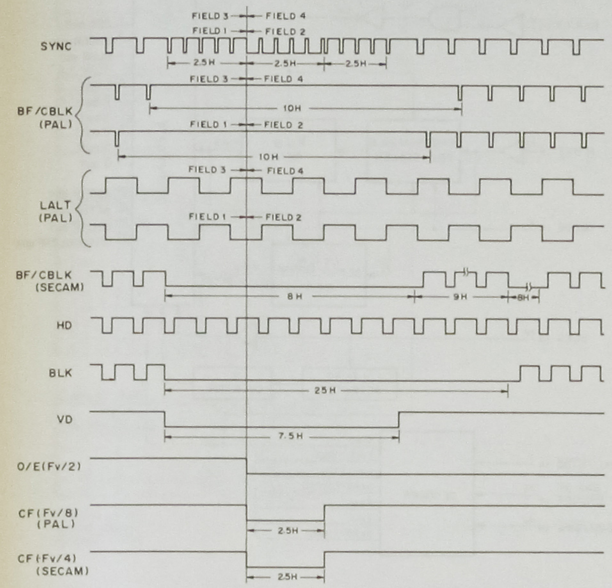

SYNC
BF/CBLK (PALM)
LALT (PALM)
BF/CBLK (NTSC)
HD
BLK
VD
O/E (FV/2)
CF (FV/4) (NTSC)
CF (FV/8) (PALM)
NTSC
PM
FIELD 4
FIELD 1
FIELD 2
FIELD 3
3H
12H
10H
20H
9H

NTSC, PAL-M (FIELD 2, 4)

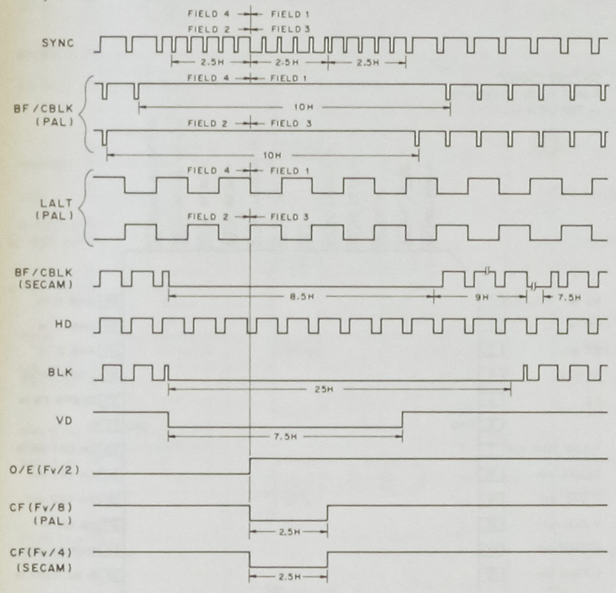

SYNC
BF/CBLK (PALM)
LALT (PALM)
BF/CBLK (NTSC)
HD
BLK
VD
O/E (FV/2)
CF (FV/4) (NTSC)
CF (FV/8) (PALM)
NTSC
PM
FIELD 1
FIELD 2
FIELD 3
FIELD 4
3H
12H
10H
20H
9H

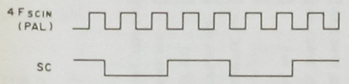

CKIN, 4FSCIN (NTSC)(PALM)
SC

PAL, SECAM (FIELD 4, 2)

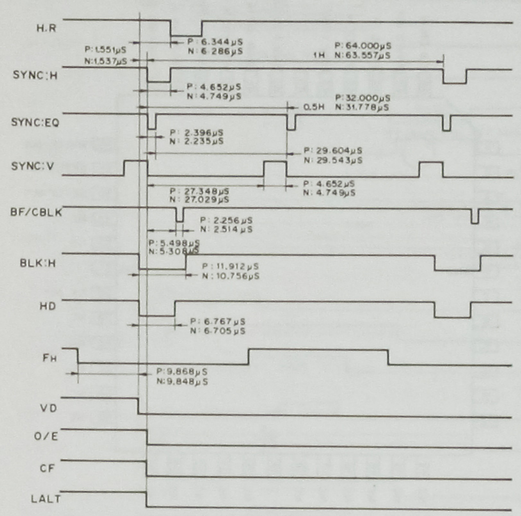

SYNC
BF/CBLK (PAL)
LALT (PAL)
BF/CBLK (SECAM)
HD
BLK
VD
O/E (FV/2)
CF (FV/8) (PAL)
CF (FV/4) (SECAM)
FIELD 3
FIELD 4
FIELD 1
FIELD 2
2.5H
10H
8H
9H
25H
7.5H

PAL, SECAM (FIELD 1, 3)

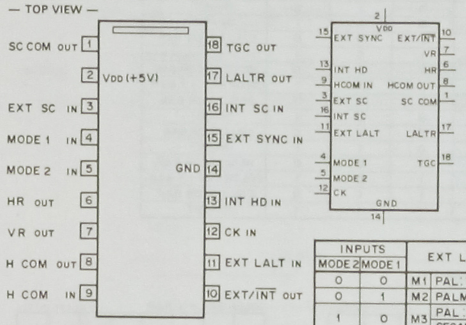

SYNC
BF/CBLK (PAL)
LALT (PAL)
BF/CBLK (SECAM)
HD
BLK
VD
O/E (FV/2)
CF (FV/8) (PAL)
CF (FV/4) (SECAM)
FIELD 4
FIELD 1
FIELD 2
FIELD 3
2.5H
10H
8.5H
9H
7.5H
25H


4FSCIN (PAL)
SC

P: PAL, SECAM
N: NTSC, PALM

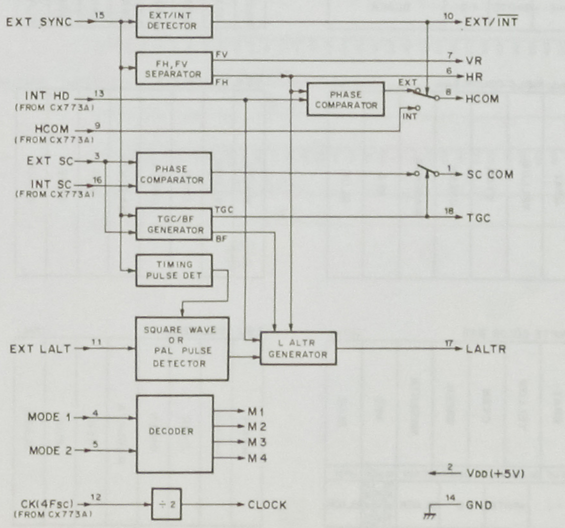

H.R
SYNC:H
SYNC:EQ
SYNC:V
BF/CBLK
BLK:H
HD
FH
VD
O/E
CF
LALT
P:1.551μS N:1.537μS
P: 6.344μS N: 6.286μS
P: 64.000μS N: 63.557μS
1H
P: 4.652μS N: 4.749μS
0.5H
P: 32.000μS N: 31.778μS
P: 2.396μS N: 2.235μS
P: 29.604μS N: 29.543μS
P: 27.348μS N: 27.029μS
P: 4.652μS N: 4.749μS
P: 2.256μS N: 2.514μS
P: 5.498μS N: 5.308μS
P: 11.912μS N: 10.756μS
P: 6.767μS N: 6.705μS
P: 9.868μS N: 9.848μS

CX7903 (SONY)
C-MOS GENLOCK DRIVER FOR CX773A
— TOP VIEW —

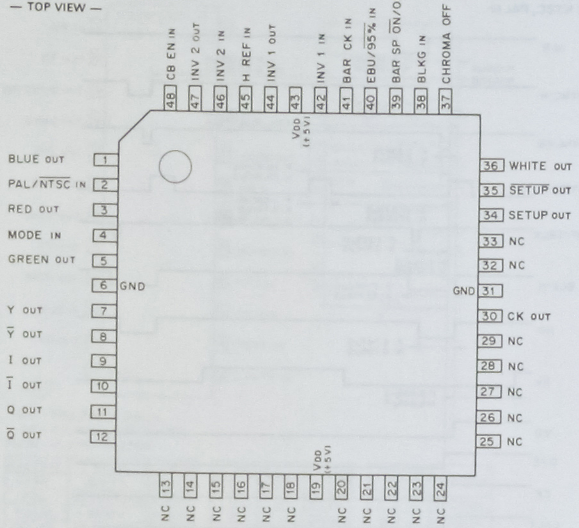

SC COM OUT 1
2 VDD (+5V)
EXT SC IN 3
MODE 1 IN 4
MODE 2 IN 5
HR OUT 6
VR OUT 7
H COM OUT 8
H COM IN 9
18 TGC OUT
17 LALTR OUT
16 INT SC IN
15 EXT SYNC IN
14 GND
13 INT HD IN
12 CK IN
11 EXT LALT IN
10 EXT/INT OUT
EXT SYNC
EXT/INT
INT HD
HCOM IN
HCOM OUT
EXT SC
SC COM
INT SC
EXT LALT
LALTR
MODE 1
MODE 2
TGC
CK
VR
HR
VDD
GND

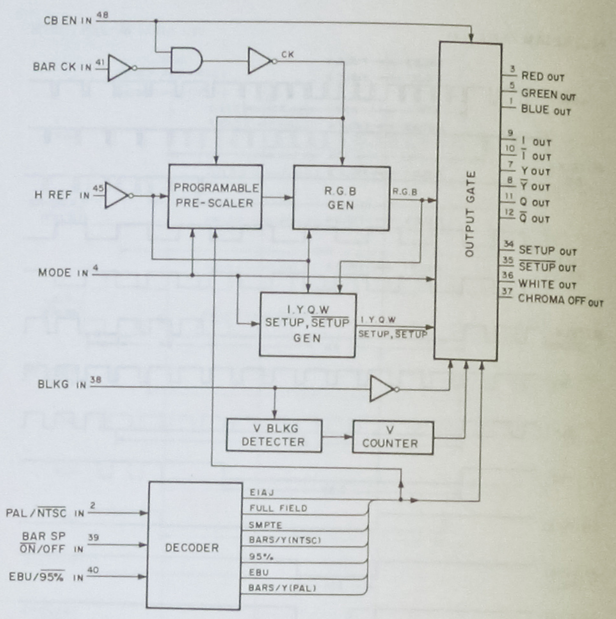
INPUTS		EXT LOCK MODE	
MODE 2	MODE 1		
0	0	M1	PAL : VBS
0	1	M2	PALM : VBS
1	0	M3	PAL : VS/SC/LALT SECAM : VS/SC/LALT
1	1	M4	NTSC : VBS NTSC : VS/SC PALM : VS/SC/LALT

0 ; LOW LEVEL
1 ; HIGH LEVEL


EXT SYNC
EXT/INT DETECTOR
FH, FV SEPARATOR
FV
FH
INT HD (FROM CX773A)
HCOM (FROM CX773A)
EXT SC
INT SC (FROM CX773A)
PHASE COMPARATOR
TGC/BF GENERATOR
TGC
BF
TIMING PULSE DET
EXT LALT
SQUARE WAVE OR PAL PULSE DETECTOR
L ALTR GENERATOR
MODE 1
MODE 2
DECODER
M1
M2
M3
M4
CK (4Fsc) (FROM CX773A)
÷2
CLOCK
EXT/INT
VR
HR
HCOM
EXT
INT
SC COM
TGC
LALTR
VDD (+5V)
GND

CX7968A (SONY)
C-MOS COLOR BAR GENERATOR
— TOP VIEW —


48 CB EN IN
47 INV 2 OUT
46 INV 2 IN
45 H REF IN
44 INV 1 OUT
43 VDD (+5V)
42 INV 1 IN
41 BAR CK IN
40 EBU/$\overline{95\%}$ IN
39 BAR SP $\overline{ON}$/OFF IN
38 BLKG IN
37 CHROMA OFF OUT
1 BLUE OUT
2 PAL/$\overline{NTSC}$ IN
3 RED OUT
4 MODE IN
5 GREEN OUT
6 GND
7 Y OUT
8 $\overline{Y}$ OUT
9 I OUT
10 $\overline{I}$ OUT
11 Q OUT
12 $\overline{Q}$ OUT
36 WHITE OUT
35 $\overline{SETUP}$ OUT
34 SETUP OUT
33 NC
32 NC
31 GND
30 CK OUT
29 NC
28 NC
27 NC
26 NC
25 NC
13 NC
14 NC
15 NC
16 NC
17 NC
18 NC
19 VDD (+5V)
20 NC
21 NC
22 NC
23 NC
24 NC

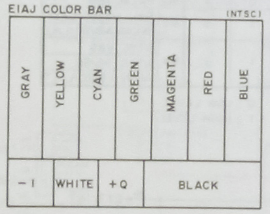

CB EN IN 48
BAR CK IN 41
CK
H REF IN 45
MODE IN 4
BLKG IN 38
PROGRAMABLE PRE-SCALER
R.G.B GEN
R.G.B
I.Y.Q.W SETUP, $\overline{SETUP}$ GEN
I.Y.Q.W SETUP, $\overline{SETUP}$
OUTPUT GATE
V BLKG DETECTER
V COUNTER
DECODER
PAL/$\overline{NTSC}$ IN 2
BAR SP $\overline{ON}$/OFF IN 39
EBU/$\overline{95\%}$ IN 40
EIAJ
FULL FIELD
SMPTE
BARS/Y(NTSC)
95%
EBU
BARS/Y(PAL)
3 RED OUT
5 GREEN OUT
1 BLUE OUT
9 I OUT
10 $\overline{I}$ OUT
7 Y OUT
8 $\overline{Y}$ OUT
11 Q OUT
12 $\overline{Q}$ OUT
34 SETUP OUT
35 $\overline{SETUP}$ OUT
36 WHITE OUT
37 CHROMA OFF OUT

INPUT				FUNCTION
PAL/$\overline{NTSC}$	MODE	EBU/$\overline{95\%}$	BAR SP	
0	0	0	0	EIAJ COLOR BAR
0	0	0	1	FULL FIELD COLOR BAR
0	0	1	0	INHIBIT
0	0	1	1	INHIBIT
0	1	0	0	EIAJ COLOR BAR
0	1	0	1	FULL FIELD COLOR BAR
0	1	1	0	SMPTE COLOR BAR
0	1	1	1	COLOR BAR + Y BAR
1	0	0	0	95% COLOR BAR
1	0	0	1	INHIBIT
1	0	1	0	EBU COLOR BAR
1	0	1	1	INHIBIT
1	1	0	0	95% COLOR BAR
1	1	0	1	COLOR BAR + Y BAR
1	1	1	0	EBU COLOR BAR
1	1	1	1	INHIBIT

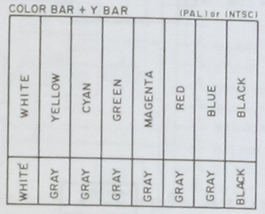
0 , LOW LEVEL
1 , HIGH LEVEL

O COLOR BAR PATTERN

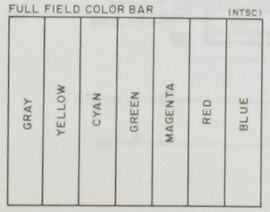
EIAJ COLOR BAR (NTSC)


GRAY
YELLOW
CYAN
GREEN
MAGENTA
RED
BLUE
− I
WHITE
+ Q
BLACK

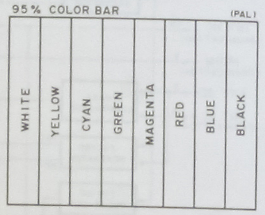
COLOR BAR + Y BAR (PAL) or (NTSC)


WHITE
YELLOW
CYAN
GREEN
MAGENTA
RED
BLUE
BLACK
WHITE
GRAY
GRAY
GRAY
GRAY
GRAY
GRAY
BLACK

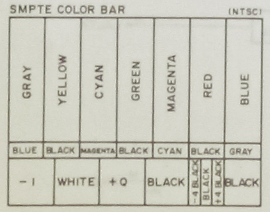
FULL FIELD COLOR BAR (NTSC)


GRAY
YELLOW
CYAN
GREEN
MAGENTA
RED
BLUE

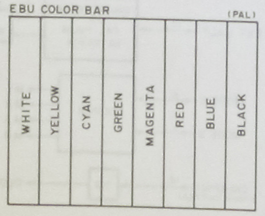
95 % COLOR BAR (PAL)


WHITE
YELLOW
CYAN
GREEN
MAGENTA
RED
BLUE
BLACK

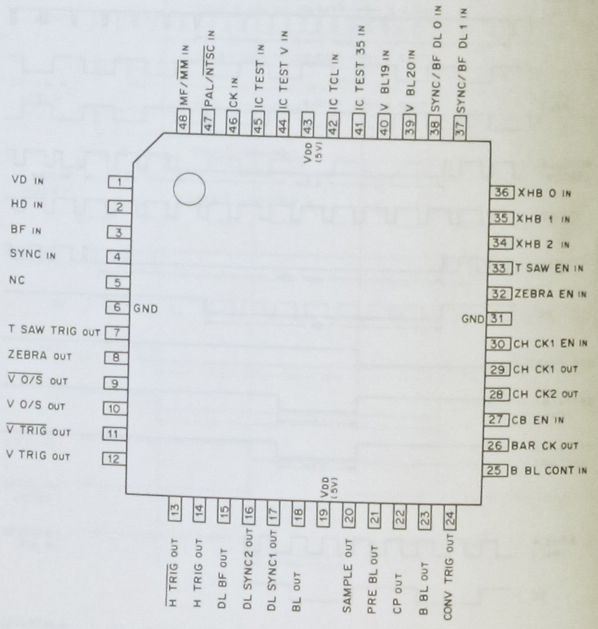
SMPTE COLOR BAR (NTSC)


GRAY
YELLOW
CYAN
GREEN
MAGENTA
RED
BLUE
BLUE
BLACK
MAGENTA
BLACK
CYAN
BLACK
GRAY
− I
WHITE
+ Q
BLACK
−4 BLACK
BLACK
+4 BLACK
BLACK

EBU COLOR BAR (PAL)


WHITE
YELLOW
CYAN
GREEN
MAGENTA
RED
BLUE
BLACK

CX7969 (SONY)
C-MOS PULSE GENERATOR
— TOP VIEW —


48 MF/$\overline{MM}$ IN
47 PAL/$\overline{NTSC}$ IN
46 CK IN
45 IC TEST IN
44 IC TEST V IN
43 VDD (5V)
42 IC TCL IN
41 IC TEST 35 IN
40 V BL19 IN
39 V BL20 IN
38 SYNC/BF DL 0 IN
37 SYNC/BF DL 1 IN
1 VD IN
2 HD IN
3 BF IN
4 SYNC IN
5 NC
6 GND
7 T SAW TRIG OUT
8 ZEBRA OUT
9 $\overline{V\ O/S}$ OUT
10 V O/S OUT
11 $\overline{V\ TRIG}$ OUT
12 V TRIG OUT
36 XHB 0 IN
35 XHB 1 IN
34 XHB 2 IN
33 T SAW EN IN
32 ZEBRA EN IN
31 GND
30 CH CK1 EN IN
29 CH CK1 OUT
28 CH CK2 OUT
27 CB EN IN
26 BAR CK OUT
25 B BL CONT IN
13 $\overline{H\ TRIG}$ OUT
14 H TRIG OUT
15 DL BF OUT
16 DL SYNC2 OUT
17 DL SYNC1 OUT
18 BL OUT
19 VDD (5V)
20 SAMPLE OUT
21 PRE BL OUT
22 CP OUT
23 B BL OUT
24 CONV TRIG OUT

1. SYSTEM DESIGNATION

INPUT	SYSTEM
PAL/$\overline{NTSC}$ IN	
1	PAL, SECAM
0	NTSC, PALM

2. TYPE OF TUBE

INPUT	FUNCTION
MF/$\overline{MM}$ IN	
1	MAG-STA TUBE
0	MAG-MAG TUBE

3. V BLKG WIDTH (NTSC ONLY)

INPUT		V BLKG WIDTH
V BL 19	V BL 20	
1	X	19H
0	0	20H
0	1	21H

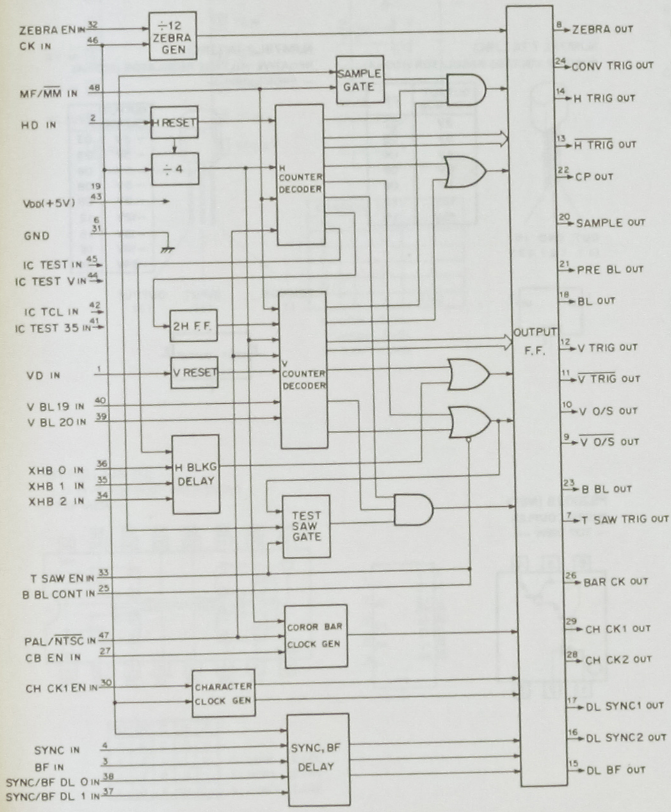
4. H BLKG WIDTH

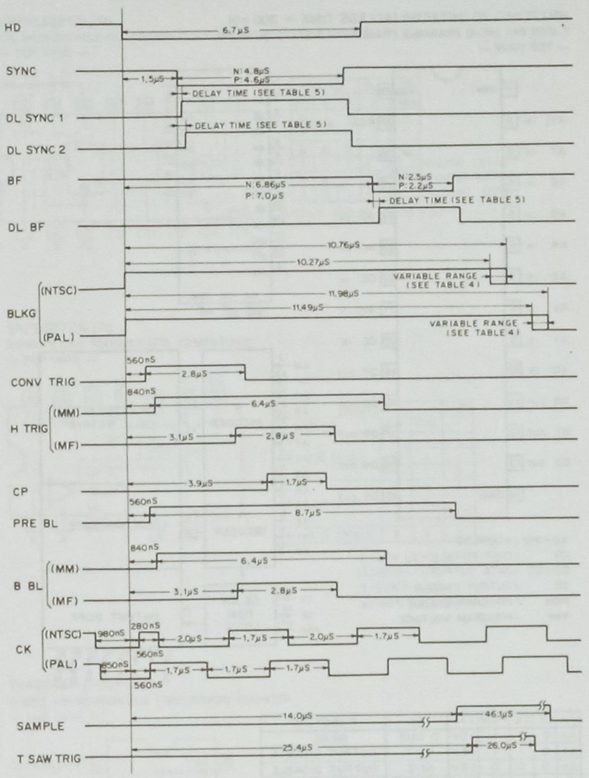
INPUT			BLKG WIDTH (μS)	
XHB2	XHB1	XHB0	NTSC	PAL
1	1	1	10.27	11.49
1	1	0	10.34	11.56
1	0	1	10.41	11.63
1	0	0	10.48	11.70
0	1	1	10.55	11.77
0	1	0	10.62	11.84
0	0	1	10.69	11.91
0	0	0	10.76	11.98

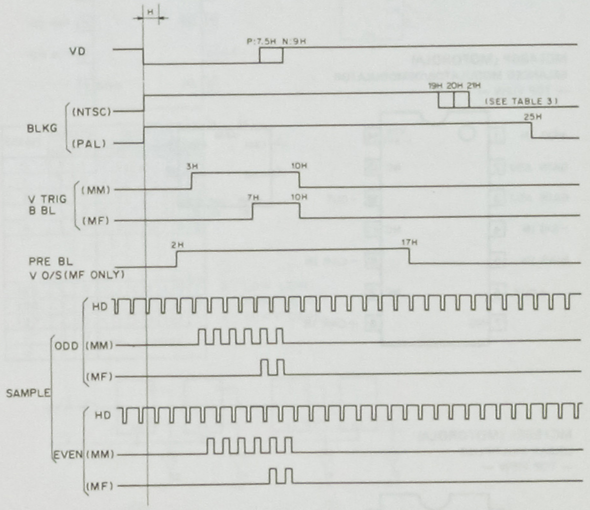
5. DELAY TIME

INPUT		DELAY TIME (nS)		
SYNC/BF DL1	SYNC/BF DL2	DL SYNC 1	DL SYNC 2	DL BF
1	1	140	210	140
1	0	210	280	210
0	1	630	700	630
0	0	700	770	700

1; HIGH LEVEL
0; LOW LEVEL
X; DON'T CARE


ZEBRA EN IN 32
CK IN 46
÷12 ZEBRA GEN
MF/$\overline{MM}$ IN 48
SAMPLE GATE
HD IN 2
H RESET
÷4
H COUNTER DECODER
VDD(+5V) 19 43
GND 6 31
IC TEST IN 45
IC TEST V IN 44
IC TCL IN 42
IC TEST 35 IN 41
2H F.F.
VD IN 1
V RESET
V COUNTER DECODER
V BL19 IN 40
V BL20 IN 39
XHB 0 IN 36
XHB 1 IN 35
XHB 2 IN 34
H BLKG DELAY
TEST SAW GATE
T SAW EN IN 33
B BL CONT IN 25
PAL/$\overline{NTSC}$ IN 47
CB EN IN 27
COROR BAR CLOCK GEN
CH CK1 EN IN 30
CHARACTER CLOCK GEN
SYNC IN 4
BF IN 3
SYNC/BF DL 0 IN 38
SYNC/BF DL 1 IN 37
SYNC, BF DELAY
OUTPUT F.F.
8 ZEBRA OUT
24 CONV TRIG OUT
14 H TRIG OUT
13 $\overline{H\ TRIG}$ OUT
22 CP OUT
20 SAMPLE OUT
21 PRE BL OUT
18 BL OUT
12 V TRIG OUT
11 $\overline{V\ TRIG}$ OUT
10 V O/S OUT
9 $\overline{V\ O/S}$ OUT
23 B BL OUT
7 T SAW TRIG OUT
26 BAR CK OUT
29 CH CK1 OUT
28 CH CK2 OUT
17 DL SYNC1 OUT
16 DL SYNC2 OUT
15 DL BF OUT

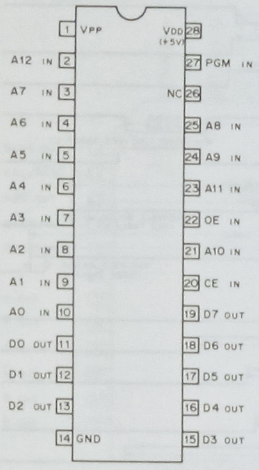


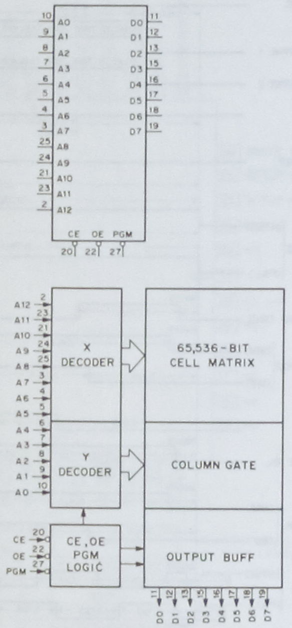


HN27C64G-20 (HITACHI) (ACCESS TIME = 200 nS)

C-MOS 64K (8K-8) ERASABLE PROM WITH 3-STATE OUTPUTS

— TOP VIEW —


1 VPP
VDD (+5V) 28
A12 IN 2
27 PGM IN
A7 IN 3
NC 26
A6 IN 4
25 A8 IN
A5 IN 5
24 A9 IN
A4 IN 6
23 A11 IN
A3 IN 7
22 OE IN
A2 IN 8
21 A10 IN
A1 IN 9
20 CE IN
A0 IN 10
19 D7 OUT
D0 OUT 11
18 D6 OUT
D1 OUT 12
17 D5 OUT
D2 OUT 13
16 D4 OUT
14 GND
15 D3 OUT


A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
D0
D1
D2
D3
D4
D5
D6
D7
CE
OE
PGM
X DECODER
Y DECODER
CE, OE PGM LOGIĆ
65,536-BIT CELL MATRIX
COLUMN GATE
OUTPUT BUFF

A0-A12 : ADDRESS
CE : CHIP ENABLE
D0-D7 : DATA OUTPUT
OE : OUTPUT ENABLE
PGM : PROGRAM ENABLE
VPP : PROGRAM VOLTAGE

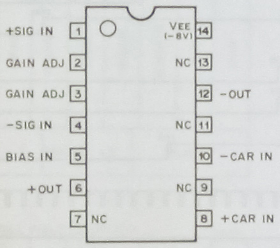
An	CE	OE	PGM	VPP	Dn	FUNCTION
An	0	0	1	+5V	D OUT	READ
An	0	1	1	+5V	HI-Z	OUTPUT DISABLE
An	0	0	0	+5V	HI-Z	OUTPUT DISABLE
X	1	X	X	+5V	HI-Z	STANDBY
An	0	X	⎍	+21V	DIN	PGM
An	0	0	1	+21V	D OUT	PGM VERIFY
X	1	X	X	+21V	HI-Z	PGM INH

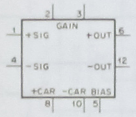
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH INPEDANCE

MC1496P (MOTOROLA)

BALANCED MODULATOR/DEMODULATOR

— TOP VIEW —

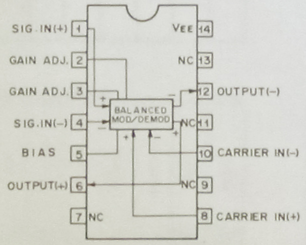

+SIG IN 1
GAIN ADJ 2
GAIN ADJ 3
-SIG IN 4
BIAS IN 5
+OUT 6
7 NC
VEE (-8V) 14
NC 13
12 -OUT
NC 11
10 -CAR IN
NC 9
8 +CAR IN


GAIN
+SIG
-SIG
+OUT
-OUT
+CAR
-CAR
BIAS

MC1595L (MOTOROLA)

LINEAR MULTIPLIER

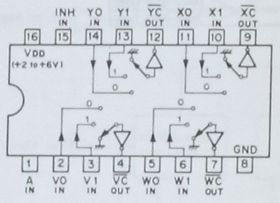
— TOP VIEW —

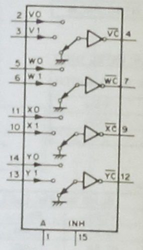

SIG. IN(+) 1
GAIN ADJ. 2
GAIN ADJ. 3
SIG. IN(-) 4
BIAS 5
OUTPUT(+) 6
7 NC
VEE 14
NC 13
12 OUTPUT(-)
NC 11
10 CARRIER IN(-)
NC 9
8 CARRIER IN(+)
BALANCED MOD/DEMOD

MC74HC158N (MOTOROLA)

C-MOS 2-LINE-TO-1-LINE INVERTED DATA SELECTOR/MULTIPLEXER

— TOP VIEW —


INH IN
Y0 IN
Y1 IN
$\overline{YC}$ OUT
X0 IN
X1 IN
$\overline{XC}$ OUT
VDD (+2 to +6V)
GND
A IN
V0 IN
V1 IN
$\overline{VC}$ OUT
W0 IN
W1 IN
$\overline{WC}$ OUT


V0
V1
$\overline{VC}$
W0
W1
$\overline{WC}$
X0
X1
$\overline{XC}$
Y0
Y1
$\overline{YC}$
A
INH

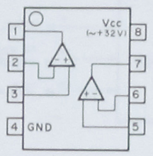
CONT. IN		ON CHANNEL
INH	A	
0	0	0
0	1	1
1	X	GND

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

NJM4556D (JRC)

OPERATIONAL AMPLIFIER

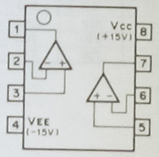
— TOP VIEW —



NJM4560D (JRC)

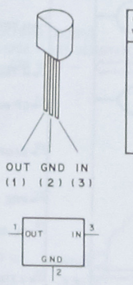
OPERATIONAL AMPLIFIER

— TOP VIEW —


Vcc (+15V)
VEE (-15V)

NJM78L ? ?A (JRC)

POSITIVE VOLTAGE REGULATOR (100mA)

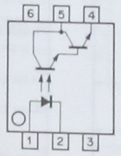

OUT (1)
GND (2)
IN (3)
OUT
IN
GND

OUTPUT VOLTAGE	??
2V	02
5V	05
6V	06
8V	08
9V	09
12V	12
15V	15

PS2002B (NEC)

PHOTO COUPLER

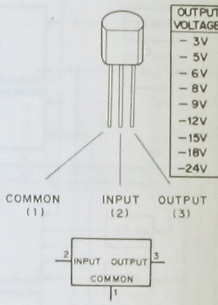
— TOP VIEW —



NJM79L ? ?A (JRC)

NEGATIVE VOLTAGE REGULATOR (100mA)

— FRONT VIEW —

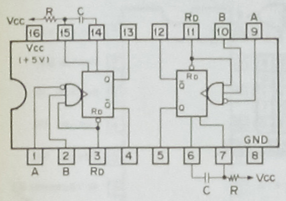

COMMON (1)
INPUT (2)
OUTPUT (3)
INPUT
OUTPUT
COMMON

OUTPUT VOLTAGE	??
-3V	03
-5V	05
-6V	06
-8V	08
-9V	09
-12V	12
-15V	15
-18V	18
-24V	24

SN74LS123N (TI)

TTL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH DIRECT RESET

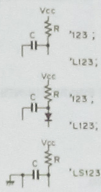
— TOP VIEW —


Vcc
R
C
RD
B
A
Vcc (+5V)
GND
A
B
RD
C
R
Vcc

INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
0	X	X	0	1
X	1	X	0	1
X	X	0	0	1
1	0	↑	⎍	⊔
1	↓	1	⎍	⊔
↑	0	1	⎍	⊔

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

OUTPUT PULSE WIDTH



'123 ; $T_W = 0.28\left(1+\frac{700}{R}\right)CR$

'L123; $T_W = 0.33\left(1+\frac{700}{R}\right)CR$

'123 ; $T_W = 0.25\left(1+\frac{700}{R}\right)CR$

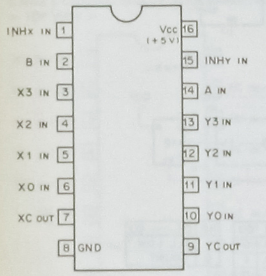
'L123; $T_W = 0.29\left(1+\frac{700}{R}\right)CR$

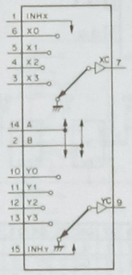
'LS123; $T_W = 0.45CR$

SN74LS153N (TI)

TTL 4-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER

— TOP VIEW —


INHx IN 1
B IN 2
X3 IN 3
X2 IN 4
X1 IN 5
X0 IN 6
XC OUT 7
8 GND
Vcc (+5V) 16
15 INHY IN
14 A IN
13 Y3 IN
12 Y2 IN
11 Y1 IN
10 Y0 IN
9 YC OUT


INHx
X0
X1
X2
X3
XC
A
B
Y0
Y1
Y2
Y3
YC
INHY

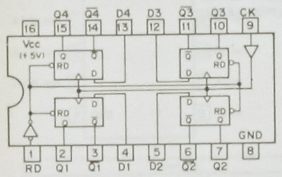
CONTROL IN			ON CHANNEL
INH	B	A	
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3
1	X	X	GND

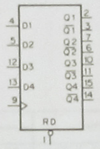
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

SN74LS175N (TI)

TTL D-TYPE FLIP-FLOP WITH CLEAR

— TOP VIEW —


Q4
$\overline{Q4}$
D4
D3
$\overline{Q3}$
Q3
CK
Vcc (+5V)
GND
RD
Q1
$\overline{Q1}$
D1
D2
$\overline{Q2}$
Q2


D1
D2
D3
D4
Q1
$\overline{Q1}$
Q2
$\overline{Q2}$
Q3
$\overline{Q3}$
Q4
$\overline{Q4}$
RD

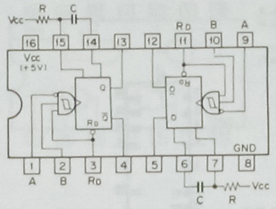
RD	CK	D	Q	$\overline{Q}$
0	X	X	0	1
1	↑	1	1	0
1	↑	0	0	1
1	0	X	Qo	$\overline{Qo}$

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

SN74LS221N (TI)

TTL MONOSTABLE MULTIVIBRATOR WITH SCHMITT TRIGGER INPUT

— TOP VIEW —


Vcc
R
C
RD
B
A
Vcc (+5V)
GND
A
B
RD
C
R
Vcc

INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
0	X	X	0	1
X	1	X	0	1
X	X	0	0	1
1	0	↑	⎍	⊔
1	↓	1	⎍	⊔
↑	0	1	⎍	⊔

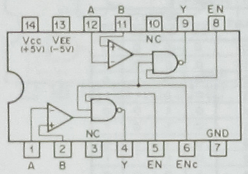
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

OUTPUT PULSE WIDTH = 0.7CR

SN75207BN (TI)

BIPOLAR LINE RECEIVER (TTL COMPATIBLE)

— TOP VIEW —


A
B
Y
EN
Vcc (+5V)
VEE (-5V)
NC
NC
GND
A
B
Y
EN
ENc

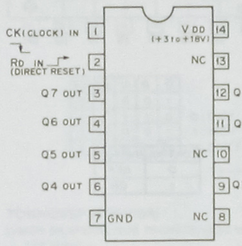
INPUTS			OUT
B - A	EN	ENc	Y
B - A ≧ 10mV	X	0	1
	0	X	1
	1	1	0
|B - A| < 10mV	X	0	1
	0	X	1
	1	1	✱
B - A ≦ -10mV	X	X	1

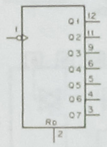
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
✱; INDETERMINATE

TC4024BP (TOSHIBA)

C-MOS ASYNCHRONOUS 7-BIT BINARY COUNTER

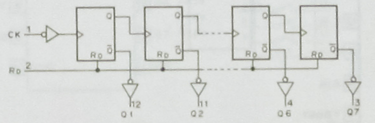
— TOP VIEW —


CK (CLOCK) IN 1
RD IN (DIRECT RESET) 2
Q7 OUT 3
Q6 OUT 4
Q5 OUT 5
Q4 OUT 6
7 GND
VDD (+3 to +18V) 14
NC 13
12 Q1 OUT
11 Q2 OUT
NC 10
9 Q3 OUT
NC 8


Q1
Q2
Q3
Q4
Q5
Q6
Q7
RD

COUNT	INPUTS		OUTPUTS						
	CK	RD	Q7	Q6	Q5	Q4	Q3	Q2	Q1
0	X	1	0	0	0	0	0	0	0
1	↓	0	0	0	0	0	0	0	1
2	↓	0	0	0	0	0	0	1	0
3	↓	0	0	0	0	0	0	1	1
4	↓	0	0	0	0	0	1	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
125	↓	0	1	1	1	1	1	0	1
126	↓	0	1	1	1	1	1	1	0
127	↓	0	1	1	1	1	1	1	1
—	0	0	NO CHANGE						
—	1	0							

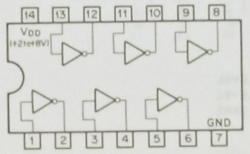
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE


CK 1
RD 2
Q
$\overline{Q}$
RD
12 Q1
11 Q2
4 Q6
3 Q7

TC40H004P (TOSHIBA)

C-MOS INVERTER

— TOP VIEW —

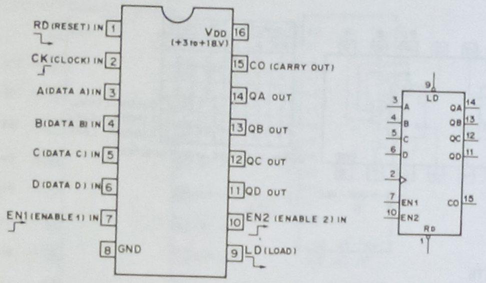

VDD (+2 to +8V)
GND

$Y = \overline{A}$

A	Y
0	1
1	0

0; LOW LEVEL
1; HIGH LEVEL

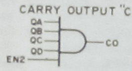
TC40163BP (TOSHIBA)
C-MOS PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER
— TOP VIEW —


RD (RESET) IN 1
CK (CLOCK) IN 2
A DATA A IN 3
B DATA B IN 4
C DATA C IN 5
D DATA D IN 6
EN1 (ENABLE 1) IN 7
8 GND
VDD (+3 to +18V) 16
15 CO (CARRY OUT)
14 QA OUT
13 QB OUT
12 QC OUT
11 QD OUT
10 EN2 (ENABLE 2) IN
9 LD (LOAD)
LD
EN1
EN2
CO
RD

MODE SELECTION

CONTROL INPUTS				MODE
RD	LD	EN1	EN2	
0	X	X	X	RESET (SYNCHRONOUS)
1	0	X	X	PRESET (SYNCHRONOUS)
1	1	0	X	NO COUNT
1	1	X	0	NO COUNT
1	1	1	1	COUNT

CARRY OUTPUT "CO"

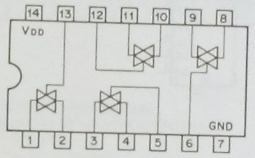

QA
QB
QC
QD
EN2
CO

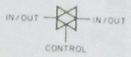
CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

COUNT SEQUENCE

COUNT	OUTPUTS			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

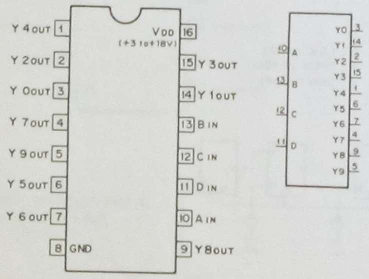
TC4016BP (TOSHIBA)
C-MOS BILATERAL SWITCH
— TOP VIEW —


VDD
GND
14
13
12
11
10
9
8
1
2
3
4
5
6
7


IN/OUT
IN/OUT
CONTROL

CONTROL	SWITCH
0	OFF
1	ON

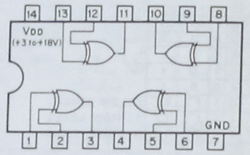
TC4028BP (TOSHIBA)
C-MOS BCD TO DECIMAL DECODER
— TOP VIEW —

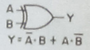

Y 4 OUT 1
Y 2 OUT 2
Y 0 OUT 3
Y 7 OUT 4
Y 9 OUT 5
Y 5 OUT 6
Y 6 OUT 7
8 GND
VDD (+3 to +18V) 16
15 Y 3 OUT
14 Y 1 OUT
13 B IN
12 C IN
11 D IN
10 A IN
9 Y 8 OUT
A
B
C
D
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
Y9

STATE	INPUTS				OUTPUTS									
	D	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	1	0	0	0	0	0	0	0	0
2	0	0	1	0	0	0	1	0	0	0	0	0	0	0
3	0	0	1	1	0	0	0	1	0	0	0	0	0	0
4	0	1	0	0	0	0	0	0	1	0	0	0	0	0
5	0	1	0	1	0	0	0	0	0	1	0	0	0	0
6	0	1	1	0	0	0	0	0	0	0	1	0	0	0
7	0	1	1	1	0	0	0	0	0	0	0	1	0	0
8	1	X	X	0	0	0	0	0	0	0	0	0	1	0
9	1	X	X	1	0	0	0	0	0	0	0	0	0	1

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

TC4030BP (TOSHIBA)
C-MOS EXCLUSIVE OR GATE
— TOP VIEW —


VDD (+3 to +18V)
GND
14
13
12
11
10
9
8
1
2
3
4
5
6
7

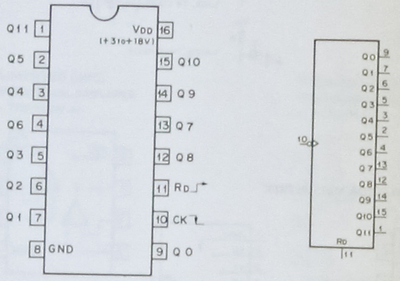


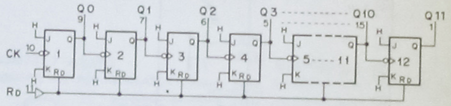
$Y = \bar{A} \cdot B + A \cdot \bar{B}$

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

0: LOW LEVEL
1: HIGH LEVEL

TC4040BP (TOSHIBA)
C-MOS 12-STAGE RIPPLE CARRY BINARY COUNTER/DRIVER
— TOP VIEW —


Q11 1
Q5 2
Q4 3
Q6 4
Q3 5
Q2 6
Q1 7
8 GND
VDD (+3 to +18V) 16
15 Q10
14 Q9
13 Q7
12 Q8
11 RD
10 CK
9 Q0
10
11
RD
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11

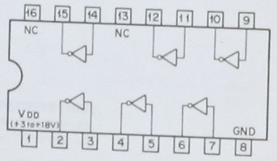

Q0
Q1
Q2
Q3
Q10
Q11
CK
10
RD
11
H
J
Q
K
RD
1
2
3
4
5 ----- 11
12

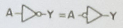
COUNT	Q11	Q10	Q9	Q8	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	1	0
3	0	0	0	0	0	0	0	0	0	0	1	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
4095	1	1	1	1	1	1	1	1	1	1	1	1

RD	Q11 ········ Q0
1	ALL LOW
0	COUNT

0; LOW LEVEL
1; HIGH LEVEL

TC4049BP (TOSHIBA)
C-MOS INVERTING TYPE BUFFER/CONVERTER
— TOP VIEW —


16
15
14
13
12
11
10
9
NC
NC
VDD (+3 to +18V)
GND
1
2
3
4
5
6
7
8

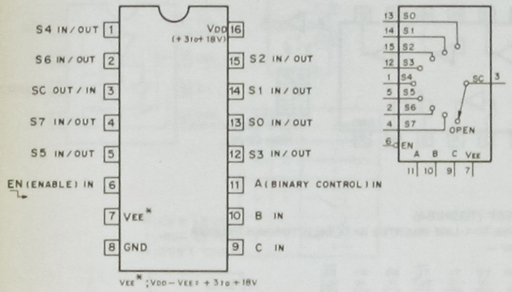


$Y = \bar{A}$

A	Y
0	1
1	0

0; LOW LEVEL
1; HIGH LEVEL

TC4051BP (TOSHIBA)
C-MOS 8-CHANNEL MULTIPLEXER/DEMULTIPLEXER
— TOP VIEW —

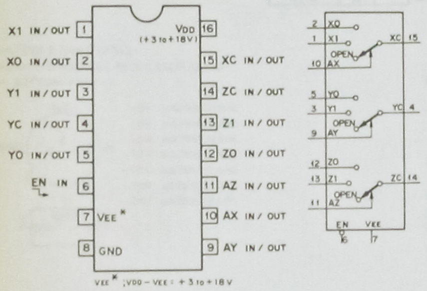

S4 IN/OUT 1
S6 IN/OUT 2
SC OUT/IN 3
S7 IN/OUT 4
S5 IN/OUT 5
EN (ENABLE) IN 6
7 VEE*
8 GND
VDD (+3 to +18V) 16
15 S2 IN/OUT
14 S1 IN/OUT
13 S0 IN/OUT
12 S3 IN/OUT
11 A (BINARY CONTROL) IN
10 B IN
9 C IN
S0
S1
S2
S3
S4
S5
S6
S7
SC
OPEN
EN
A
B
C
VEE

VEE*; VDD − VEE: +3 to +18V

EN	C	B	A	"ON" CHANNEL
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	X	X	X	OPEN

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

TC4053BP (TOSHIBA)
C-MOS 2-CHANNEL MULTIPLEXER/DEMULTIPLEXER
— TOP VIEW —

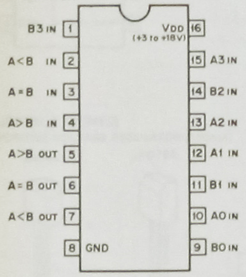

X1 IN/OUT 1
X0 IN/OUT 2
Y1 IN/OUT 3
YC IN/OUT 4
Y0 IN/OUT 5
EN IN 6
7 VEE*
8 GND
VDD (+3 to +18V) 16
15 XC IN/OUT
14 ZC IN/OUT
13 Z1 IN/OUT
12 Z0 IN/OUT
11 AZ IN/OUT
10 AX IN/OUT
9 AY IN/OUT
X0
X1
AX
XC
Y0
Y1
AY
YC
Z0
Z1
AZ
ZC
OPEN
EN
VEE

VEE*; VDD − VEE: +3 to +18V

CONT. INPUTS		ON CHANNEL
EN	A (X, Y, Z,)	
0	0	0
0	1	1
1	X	OPEN

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE.

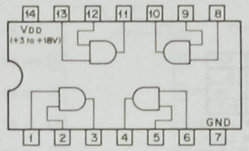
TC4063BP (TOSHIBA)
C-MOS 4-BIT MAGNITUDE COMPARATOR
— TOP VIEW —

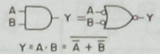

B3 IN 1
A<B IN 2
A=B IN 3
A>B IN 4
A>B OUT 5
A=B OUT 6
A<B OUT 7
8 GND
VDD (+3 to +18V) 16
15 A3 IN
14 B2 IN
13 A2 IN
12 A1 IN
11 B1 IN
10 A0 IN
9 B0 IN

INPUTS							OUTPUTS		
COMPARATING				CASCADING					
A3,B3	A2,B2	A1,B1	A0,B0	A<B	A=B	A>B	A<B	A=B	A>B
A3>B3	X	X	X	X	X	X	0	0	1
A3=B3	A2>B2	X	X	X	X	X	0	0	1
A3=B3	A2=B2	A1>B1	X	X	X	X	0	0	1
A3=B3	A2=B2	A1=B1	A0>B0	X	X	X	0	0	1
A3=B3	A2=B2	A1=B1	A0=B0	0	0	0	0	0	1
A3=B3	A2=B2	A1=B1	A0=B0	0	1	1	0	1	0
A3=B3	A2=B2	A1=B1	A0=B0	1	0	0	1	0	0
A3=B3	A2=B2	A1=B1	A0<B0	X	X	X	1	0	0
A3=B3	A2=B2	A1<B1	X	X	X	X	1	0	0
A3=B3	A2<B2	X	X	X	X	X	1	0	0
A3<B3	X	X	X	X	X	X	1	0	0

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

TC4081BP (TOSHIBA)
C-MOS 2-INPUT AND GATE
— TOP VIEW —


VDD (+3 to +18V)
GND
14
13
12
11
10
9
8
1
2
3
4
5
6
7

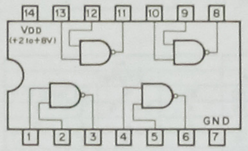


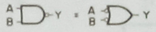
$Y = A \cdot B = \overline{\bar{A} + \bar{B}}$

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

0; LOW LEVEL
1; HIGH LEVEL

TC40H000P (TOSHIBA)
C-MOS 2-INPUT NAND GATE
— TOP VIEW —


VDD (+2 to +8V)
GND
14
13
12
11
10
9
8
1
2
3
4
5
6
7

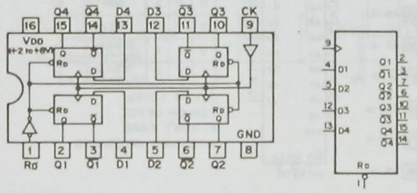


$Y = \overline{A \cdot B} = \bar{A} + \bar{B}$

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0; LOW LEVEL
1; HIGH LEVEL

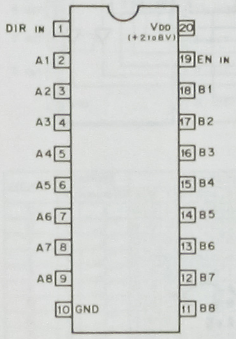
TC40H175P (TOSHIBA)
C-MOS D-TYPE FLIP-FLOP WITH CLEAR
— TOP VIEW —


Q4
Q̄4
D4
D3
Q̄3
Q3
CK
16
15
14
13
12
11
10
9
VDD (+2 to +8V)
GND
1
2
3
4
5
6
7
8
RD
Q1
Q̄1
D1
D2
Q̄2
Q2
D
Q
Q̄
RD
D1
D2
D3
D4
Q1
Q̄1
Q2
Q̄2
Q3
Q̄3
Q4
Q̄4

RD	CK	D	Q	Q̄
0	X	X	0	1
1	_⌠	1	1	0
1	_⌠	0	0	1
1	0	X	Q_0	$\bar{Q}_0$

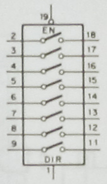
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

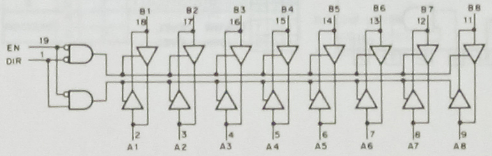
TC40H245P (TOSHIBA)
C-MOS BILATERAL BUS TRANSCEIVERS WITH 3-STATE OUTPUT
— TOP VIEW —


DIR IN 1
A1 2
A2 3
A3 4
A4 5
A5 6
A6 7
A7 8
A8 9
10 GND
VDD (+2 to +8V) 20
19 EN IN
18 B1
17 B2
16 B3
15 B4
14 B5
13 B6
12 B7
11 B8

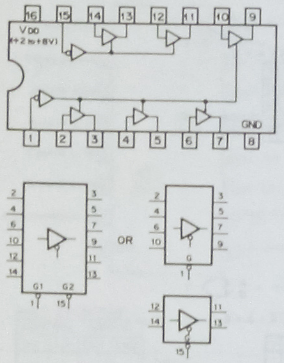
EN	DIR	OPERATION
0	0	B to A
0	1	A to B
1	X	HI − Z

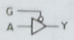
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE.


19
EN
DIR
2
3
4
5
6
7
8
9
18
17
16
15
14
13
12
11


B1
B2
B3
B4
B5
B6
B7
B8
EN
DIR
A1
A2
A3
A4
A5
A6
A7
A8

TC40H367P (TOSHIBA)
C-MOS BUS DRIVER WITH 3-STATE OUTPUTS
— TOP VIEW —

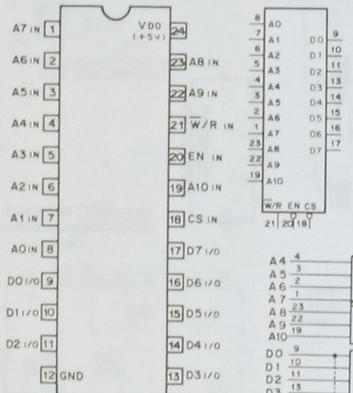

16
15
14
13
12
11
10
9
VDD
(+2 to +8V)
GND
1
2
3
4
5
6
7
8
2
4
6
10
12
14
3
5
7
9
11
13
G1
G2
1
15
OR
G
1
15



G	A	Y
0	0	0
0	1	1
1	X	HI-Z

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

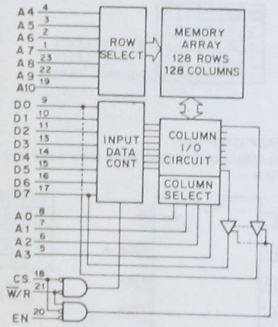
TC5517APL (TOSHIBA) (ACCESS TIME = 250 nS)
C-MOS 16384(2048x8)-BIT HIGH SPEED STATIC RAM
— TOP VIEW —


A7 IN 1
A6 IN 2
A5 IN 3
A4 IN 4
A3 IN 5
A2 IN 6
A1 IN 7
A0 IN 8
D0 I/O 9
D1 I/O 10
D2 I/O 11
12 GND
VDD (+5V) 24
23 A8 IN
22 A9 IN
21 $\overline{W}$/R IN
20 EN IN
19 A10 IN
18 CS IN
17 D7 I/O
16 D6 I/O
15 D5 I/O
14 D4 I/O
13 D3 I/O
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
D0
D1
D2
D3
D4
D5
D6
D7
$\overline{W}$/R EN CS
21 20 18

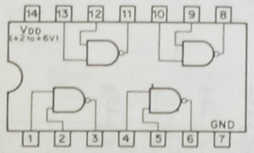
INPUTS			FUNCTION
CS	$\overline{W}$/R	EN	
0	0	X	WRITE
0	1	0	READ
0	1	1	DISABLE (OUTPUT=HI-Z)
1	X	X	DISABLE (OUTPUT=HI-Z)

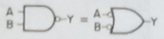
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

A0 – A10	ADDRESS INPUTS
$\overline{W}$/R	WRITE/READ ENABLE
EN	OUTPUT ENABLE
CS	CHIP SELECT
D0 – D7	DATA INPUTS/OUTPUTS


A4
A5
A6
A7
A8
A9
A10
ROW SELECT
MEMORY ARRAY 128 ROWS 128 COLUMNS
D0
D1
D2
D3
D4
D5
D6
D7
INPUT DATA CONT
COLUMN I/O CIRCUIT
COLUMN SELECT
A0
A1
A2
A3
CS
$\overline{W}$/R
EN

TC74HC00P (TOSHIBA)
C-MOS 2-INPUT NAND GATE
— TOP VIEW —


14
13
12
11
10
9
8
VDD
(+2 to +6V)
GND
1
2
3
4
5
6
7

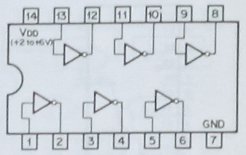


$Y = \overline{A \cdot B} = \overline{A} + \overline{B}$

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0; LOW LEVEL
1; HIGH LEVEL

TC74HC04P (TOSHIBA)
C-MOS INVERTER
— TOP VIEW —

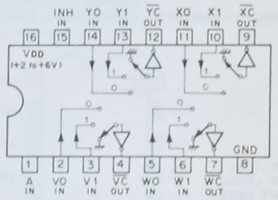

14
13
12
11
10
9
8
VDD
(+2 to +6V)
GND
1
2
3
4
5
6
7

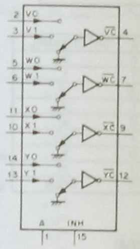
$Y = \overline{A}$

A	Y
0	1
1	0

0: LOW LEVEL
1: HIGH LEVEL

TC74HC158P (TOSHIBA)
C-MOS 2-LINE-TO-1-LINE INVERTED DATA SELECTOR/MULTIPLEXER
— TOP VIEW —

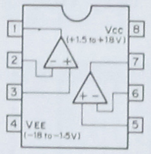

INH IN
Y0 IN
Y1 IN
$\overline{YC}$ OUT
X0 IN
X1 IN
$\overline{XC}$ OUT
16
15
14
13
12
11
10
9
VDD
(+2 to +6V)
GND
1
2
3
4
5
6
7
8
A IN
V0 IN
V1 IN
$\overline{VC}$ OUT
W0 IN
W1 IN
$\overline{WC}$ OUT


2 V0
3 V1
$\overline{VC}$ 4
5 W0
6 W1
$\overline{WC}$ 7
11 X0
10 X1
$\overline{XC}$ 9
14 Y0
13 Y1
$\overline{YC}$ 12
A
INH
1
15

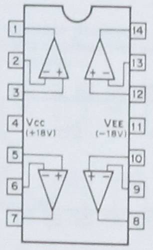
CONT. IN		ON CHANNEL
INH	A	
0	0	0
0	1	1
1	X	GND

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

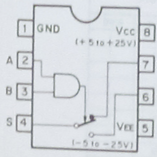
TL062CP (TI)
OPERATIONAL AMPLIFIER
(JFET INPUT)
— TOP VIEW —

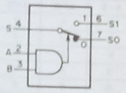

1
2
3
4
VEE
(−18 to −1.5V)
Vcc
(+1.5 to +18V)
8
7
6
5

TL064CN (TI)
OPERATIONAL AMPLIFIER
(J FET-INPUT)
— TOP VIEW —


1
2
3
4
Vcc
(+18V)
5
6
7
14
13
12
11
VEE
(−18V)
10
9
8

TL601CP (TI)
P-MOS ANALOG SWITCH
— TOP VIEW —

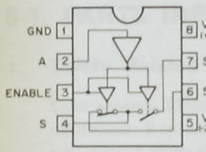

1 GND
A 2
B 3
S 4
Vcc
(+5 to +25V)
8
7 S0
6 S1
VEE
(−5 to −25V)
5

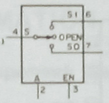

S 4
A 2
B 3
1
0
6 S1
7 S0

CONT	IN	ON CHANNEL
A	B	
0	0	S0
0	1	S0
1	0	S0
1	1	S1

0; LOW LEVEL
1; HIGH LEVEL

TLP651 (TOSHIBA)
PHOTO COUPLER
— TOP VIEW —

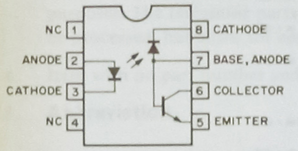

GND 1
A 2
ENABLE 3
S 4
8 Vss
(+5 to +25V)
7 S0
6 S1
5 VDD
(−25 to −5V)


4 S
S1 6
OPEN
S0 7
A
EN
2
3

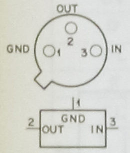
INPUTS		SW
A	EN	
X	0	OPEN
0	1	6 7
1	1	6 7

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

uA79M??AHC (FSC)
NEGATIVE VOLTAGE REGULATOR (0.5A)
— BOTTOM VIEW —

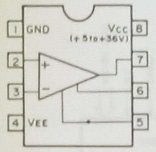

NC 1
ANODE 2
CATHODE 3
NC 4
8 CATHODE
7 BASE, ANODE
6 COLLECTOR
5 EMITTER

uA79M ? ?AHC (FSC)
NEGATIVE VOLTAGE REGULATOR (0.5A)
— BOTTOM VIEW —

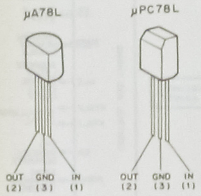

OUT
2
GND
1
3
IN
1
GND
2
OUT
IN
3

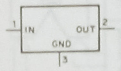
−5V	µA79M05AHC
−6V	µA79M06AHC
−8V	µA79M08AHC
−12V	µA79M12AHC
−15V	µA79M15AHC
−20V	µA79M20AHC
−24V	µA79M24AHC

uPC311C (NEC)
VOLTAGE COMPARATOR
— TOP VIEW —


1 GND
2
3
4 VEE
Vcc
(+5 to +36V)
8
7
6
5

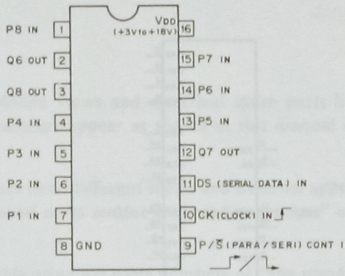
uPC78L ? ?A (NEC)
POSITIVE VOLTAGE REGULATOR (100mA)

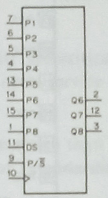

µA78L
µPC78L
OUT (2)
GND (3)
IN (1)
OUT (2)
GND (3)
IN (1)


1
IN
OUT
2
GND
3

2.6V	µA78L26AWV	µA78L02ACL	
5V	µA78L05AWV	µA78L05ACL	µPC78L05(A)
6.2V	µA78L62AWV	µA78L06ACL	
8V		µA78L08ACL	µPC78L08
8.2V	µA78L82AWV		
9V	µA78L09AWV	µA78L09ACL	
10V		µA78L10ACL	
12V	µA78L12 AWV	µA78L12 ACL	µPC78L12
15V	µA78L15 AWV	µA78L15 ACL	µPC78L15
18V	µA78L18 AWV		
24V	µA78L24 AWV		

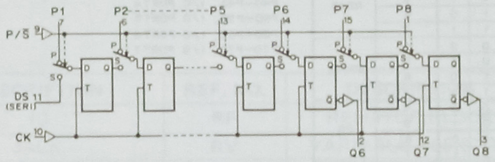
uPD4014BC (NEC)
C-MOS SYNCHRONOUS SERIAL/PARALLEL 8-BIT STATIC SHIFT REGISTER
— TOP VIEW —


P8 IN 1
Q6 OUT 2
Q8 OUT 3
P4 IN 4
P3 IN 5
P2 IN 6
P1 IN 7
8 GND
VDD (+3V to +18V) 16
15 P7 IN
14 P6 IN
13 P5 IN
12 Q7 OUT
11 DS (SERIAL DATA) IN
10 CK (CLOCK) IN
9 P/$\overline{S}$ (PARA/SERI) CONT IN

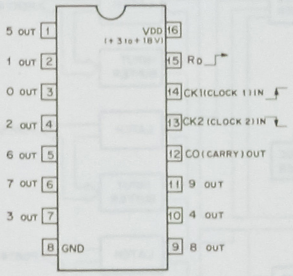

7 P1
6 P2
5 P3
4 P4
13 P5
14 P6
15 P7
1 P8
11 DS
9 P/$\overline{S}$
10
Q6 2
Q7 12
Q8 3

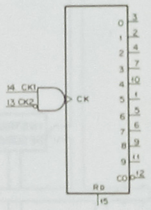
tn				tn+1							
INPUTS				INTERNAL OUTPUTS					OUTPUTS		
P/$\overline{S}$ CONT	CK	P	DS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
1	⨍	P1∼P8	X	P1	P2	P3	P4	P5	P6	P7	P8
0	⨍	X	1	1	Q1n	Q2n	Q3n	Q4n	Q5n	Q6n	Q7n
0	⨍	X	0	0	Q1n	Q2n	Q3n	Q4n	Q5n	Q6n	Q7n
X	0	X	X	Q1n	Q2n	Q3n	Q4n	Q5n	Q6n	Q7n	Q8n

0; LOW LEVEL X; DON'T CARE. tn; BEFORE CLOCK
1; HIGH LEVEL tn+1; AFTER CLOCK


P1
P2
P5
P6
P7
P8
7
6
13
14
15
1
P/$\overline{S}$ 9
P
S
D
Q
T
$\overline{Q}$
DS 11 (SERI)
CK 10
2
Q6
12
Q7
3
Q8

uPD4017BC (NEC)
C-MOS DECADE COUNTER/DIVIDER
— TOP VIEW —

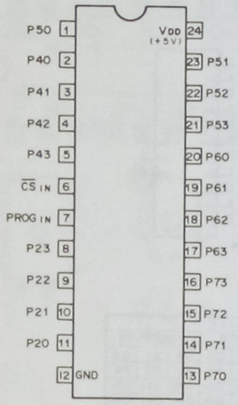

5 OUT 1
1 OUT 2
0 OUT 3
2 OUT 4
6 OUT 5
7 OUT 6
3 OUT 7
8 GND
VDD (+3 to +18V) 16
15 RD
14 CK1 (CLOCK 1) IN
13 CK2 (CLOCK 2) IN
12 CO (CARRY) OUT
11 9 OUT
10 4 OUT
9 8 OUT

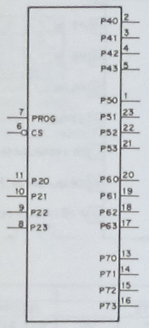

14 CK1
13 CK2
CK
0 3
1 2
2 4
3 7
4 10
5 1
6 5
7 6
8 9
9 11
CO 12
RD
15

COUNT	INPUTS		OUTPUTS										
	RD	CK=CK1·$\overline{CK2}$	9	8	7	6	5	4	3	2	1	0	CO
0	1	X	0	0	0	0	0	0	0	0	0	1	1
0	0	⨍	0	0	0	0	0	0	0	0	0	1	1
1	0	⨍	0	0	0	0	0	0	0	0	1	0	1
2	0	⨍	0	0	0	0	0	0	0	1	0	0	1
3	0	⨍	0	0	0	0	0	0	1	0	0	0	1
4	0	⨍	0	0	0	0	0	1	0	0	0	0	1
5	0	⨍	0	0	0	0	1	0	0	0	0	0	0
6	0	⨍	0	0	0	1	0	0	0	0	0	0	0
7	0	⨍	0	0	1	0	0	0	0	0	0	0	0
8	0	⨍	0	1	0	0	0	0	0	0	0	0	0
9	0	⨍	1	0	0	0	0	0	0	0	0	0	0
NO COUNT	0	1	NO CHANGE										
	0	0											

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

uPD82C43C (NEC)
C-MOS I/O PORT EXPANDER
— TOP VIEW —


P50 1
P40 2
P41 3
P42 4
P43 5
CS IN 6
PROG IN 7
P23 8
P22 9
P21 10
P20 11
12 GND
VDD (+5V) 24
23 P51
22 P52
21 P53
20 P60
19 P61
18 P62
17 P63
16 P73
15 P72
14 P71
13 P70

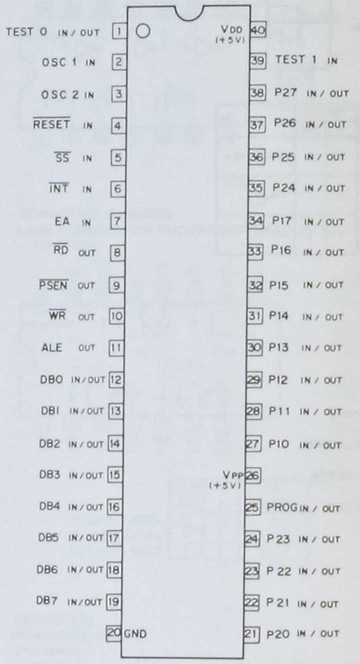

PROG
CS
P20
P21
P22
P23
P40
P41
P42
P43
P50
P51
P52
P53
P60
P61
P62
P63
P70
P71
P72
P73

CONTROL AND PORT ADDRESSING

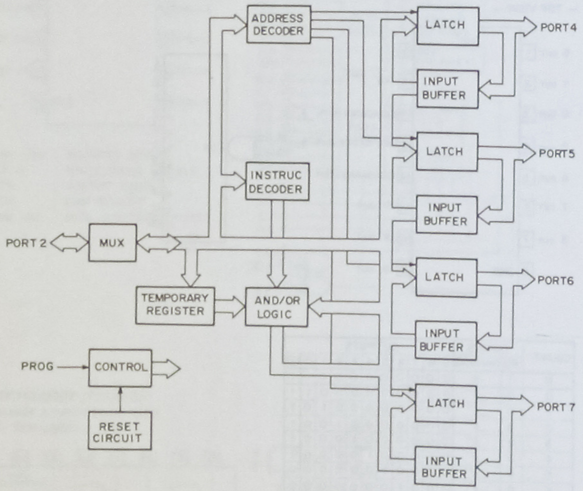
P23	P22	P21	P20	PORT	CONTROL
0	0	0	0	4	READ
0	0	0	1	5	
0	0	1	0	6	
0	0	1	1	7	
0	1	0	0	4	WRITE
0	1	0	1	5	
0	1	1	0	6	
0	1	1	1	7	
1	0	0	0	4	OR
1	0	0	1	5	
1	0	1	0	6	
1	0	1	1	7	
1	1	0	0	4	AND
1	1	0	1	5	
1	1	1	0	6	
1	1	1	1	7	

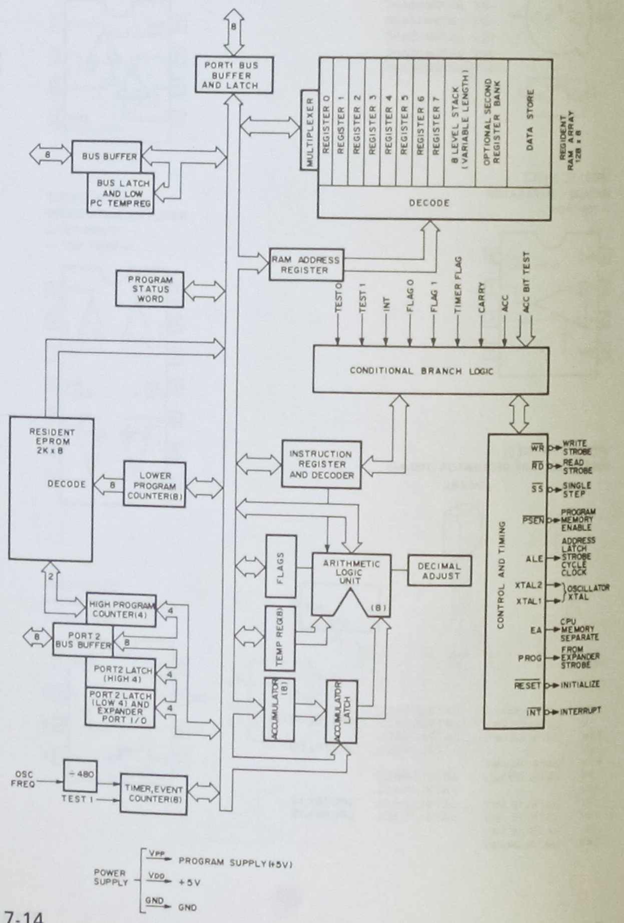
PROG ; PROGRAM PULSE INPUT
$\overline{CS}$; CHIP SELECT INPUT
P20~P23 ; I/O PORT 2 (FOR CPU)
P40~P43 ; I/O PORT 4
P50~P53 ; I/O PORT 5
P60~P63 ; I/O PORT 6
P70~P73 ; I/O PORT 7

uPD8749HD (NEC)
N-MOS 8-BIT MICROPROCESSOR
— TOP VIEW —


TEST 0 IN / OUT 1
OSC 1 IN 2
OSC 2 IN 3
RESET IN 4
SS IN 5
INT IN 6
EA IN 7
RD OUT 8
PSEN OUT 9
WR OUT 10
ALE OUT 11
DB0 IN / OUT 12
DB1 IN / OUT 13
DB2 IN / OUT 14
DB3 IN / OUT 15
DB4 IN / OUT 16
DB5 IN / OUT 17
DB6 IN / OUT 18
DB7 IN / OUT 19
20 GND
VDD (+5V) 40
39 TEST 1 IN
38 P27 IN / OUT
37 P26 IN / OUT
36 P25 IN / OUT
35 P24 IN / OUT
34 P17 IN / OUT
33 P16 IN / OUT
32 P15 IN / OUT
31 P14 IN / OUT
30 P13 IN / OUT
29 P12 IN / OUT
28 P11 IN / OUT
27 P10 IN / OUT
VPP (+5V) 26
25 PROG IN / OUT
24 P23 IN / OUT
23 P22 IN / OUT
22 P21 IN / OUT
21 P20 IN / OUT

$\overline{ALE}$; ADDRESS LATCH ENABLE
PS$\overline{EN}$; PROGRAM STORE ENABLE
$\overline{SS}$; SINGLE STEP
EA ; EXTERNAL ACCESS
PROG ; PROGRAM PULSE
$\overline{RD}$; READ
$\overline{WR}$; WRITE


ADDRESS DECODER
INSTRUC DECODER
PORT 2
MUX
TEMPORARY REGISTER
AND/OR LOGIC
PROG
CONTROL
RESET CIRCUIT
LATCH
INPUT BUFFER
PORT4
PORT5
PORT6
PORT 7


8
PORT1 BUS BUFFER AND LATCH
BUS BUFFER
BUS LATCH AND LOW PC TEMP REG
PROGRAM STATUS WORD
MULTIPLEXER
REGISTER 0
REGISTER 1
REGISTER 2
REGISTER 3
REGISTER 4
REGISTER 5
REGISTER 6
REGISTER 7
8 LEVEL STACK (VARIABLE LENGTH)
OPTIONAL SECOND REGISTER BANK
DATA STORE
RESIDENT RAM ARRAY 128 x 8
DECODE
RAM ADDRESS REGISTER
TEST 0
TEST 1
INT
FLAG 0
FLAG 1
TIMER FLAG
CARRY
ACC
ACC BIT TEST
CONDITIONAL BRANCH LOGIC
RESIDENT EPROM 2K x 8
DECODE
LOWER PROGRAM COUNTER(8)
INSTRUCTION REGISTER AND DECODER
HIGH PROGRAM COUNTER(4)
PORT 2 BUS BUFFER
PORT2 LATCH (HIGH 4)
PORT 2 LATCH (LOW 4) AND EXPANDER PORT I/O
FLAGS
TEMP REG(8)
ACCUMULATOR (8)
ACCUMULATOR LATCH
ARITHMETIC LOGIC UNIT
DECIMAL ADJUST
CONTROL AND TIMING
WR WRITE STROBE
RD READ STROBE
SS SINGLE STEP
PSEN PROGRAM MEMORY ENABLE
ALE ADDRESS LATCH STROBE CYCLE CLOCK
XTAL2
XTAL1 OSCILLATOR XTAL
EA CPU MEMORY SEPARATE
PROG FROM EXPANDER STROBE
RESET INITIALIZE
INT INTERRUPT
OSC FREQ
÷480
TEST 1
TIMER/EVENT COUNTER(8)
POWER SUPPLY
VPP PROGRAM SUPPLY(+5V)
VDD +5V
GND GND

SECTION 8
SPARE PARTS

8-1. PARTS INFORMATION

1. **Safety Related Component Warning**

   Components identified by shading on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear as shown in this manual or in service bulletins and service manual supplements published by Sony.

2. Replace Parts that are supplied from Sony Parts Center can sometimes have different shape and external appearance than what are actually used in equipment. This is due to **"accomodating the improved parts and/or engineering changes"** or **"standardization of genuine parts"**.

   - This manual's exploded views and electrical spare parts list are indicating the parts numbers of "the standardized genuine parts" at present".
   - Regarding engineering parts changes in our engineering department, refer Sony service bulletins and service manual supplements.

3. **Printed Components in Bold-Face type** on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

4. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

5. **Abbreviation**

REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION
C	CAPACITOR	IC	IC	RP	RESISTOR BLOCK
CN	CONNECTOR	J	JACK	RV	VARIABLE RESISTOR
CV	VARIABLE CAPACITOR	L	INDUCTOR	RY	RELAY
D	DIODE	LV	VARIABLE INDUCTOR	S	SWITCH
DL	DELAY LINE	M	FAN	T	TRANSFORMER
F	FUSE	Q	TRANSISTOR	X	OSCILLATOR
FL	FILTER	R	RESISTOR		

All capacitors are in micro farads unless otherwise specified.
All inductors are in micro henries unless otherwise specified.
All resistors are in ohms.